DOCUMENT RESUME

ED 203 168	CE 029 328
TITLE	Competency-Based Horticulture: Floriculture.
INSTITUTION	College of DuPage, Glen Ellyn, Ill.
SPONS AGENCY	Illinois State Board of Education, Springfield. Dept. of Adult, Vocational and Technical Education.
PUB DATE	30 Jun 81
CONTRACT	R-33-10-X-0442-317: R-33-21-D-0542-317
NOTE	348p.: For related documents see CE 029 326-327 and ED 189 387-388.
EDRS PRICE	MF01/PC14 Plus Postage.
DESCRIPTORS	*Agricultural Education: Behavioral Objectives: Competence: *Competency Based Education: Crop Processing Occupations: Disease Control: Educational Resources: Equipment Maintenance: Equipment Utilization: Fertilizers: *Floriculture: Guidelines: Hand Tools: Harvesting: *Horticulture: Instructional Materials: *Job Skills: Landscaping: Learning Activities: Ornamental Horticulture Occupations: Pesticides: Plant Growth: Plant Pathology: Plant Propagation: Postsecondary Education: Secondary Education: Soil Science: Storage: *Vocational Education
IDENTIFIERS	Environmental Control: Irrigation: Packaging

ABSTRACT

This competency-based horticulture curriculum guide is designed to provide secondary and postsecondary horticulture teachers with a task-oriented program in floriculture. It contains a master resource list, a listing of floriculture resources available from various states, and 89 competency task sheets organized into nine competency areas. These areas are maintenance and repairs: field soils: media mixes: planting and propagating plants: cultural and environmental control practices: irrigation practices: plant pest and disease control: harvesting crops: and packaging, storing, and shipping. A task statement, a performance objective, suggested learning activities, evaluation procedures, selected resources, and a performance guide are provided in each competency task sheet. Instructor check lists designed to help instructors determine acceptable levels of student performance are also included in the units. (Related competency-based horticulture curriculum guides in the areas of gardening/groundskeeping and turfgrass maintenance are available separately through ERIC--see note.) (MN)

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Competency-Based Horticulture: Floriculture

Illinois
State Board of
Education

Adult,
Vocational and
Technical Education

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State Superintendent
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Research and
Development Section

June, 1981

U.S. DEPARTMENT OF HEALTH,
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FOREWORD

The Illinois State Board of Education is committed to assisting local communities in the development of quality instructional programs to prepare persons for occupations in Ornamental Horticulture. This 'Competency-Based Horticulture: Floriculture' curriculum guide is designed to provide the secondary and post-secondary horticulture teacher with a task oriented program in Floriculture. It is one in a series of three guides which includes Gardening-Groundskeeping and Turfgrass Maintenance Worker. Each competency-based guide includes a variety of enabling activities, resources and evaluation strategies so that teachers may choose those which best serve their teaching methods and their students' learning styles.

This guide was developed using a process which includes validation of the Vocational-Technical Education Consortium of States (V-TECS) tasks by members of the Illinois Horticulture Industry. These tasks were validated and revised to reflect job duties performed in Floriculture occupations in Illinois. Teaching and evaluation strategies and resources were then identified for each task. The guide was field tested in nine Illinois schools and critiqued by other Illinois horticulture teachers.

Sincere appreication is extended to all horticulture industry and teaching personnel who assisted in the development of this curriculum guide. Recognition is given to the following individuals for their outstanding contribution: Ms. Susan E. Bates, Project Director; Dr. Robert G. Huntley, Initial Project Director; Mr. Jesse Felix, Advisory Council Member; Mr. David James, Advisory Council Member; Mr. Timothy Kelly, Advisory Council Member; Mr. Harry Lavero, Advisory Council Member; Ms. Cathy Martin, Advisory Council Member; Mr. Philip Brown, Field Test Teacher; Ms. Alice Dries, Field Test Teacher; Mr. Robert Mills, Field Test Teacher; Mr. James Morrison, Field Test Teacher; Mr. Samuel Ochs, Field Test Teacher; Ms. Amy Swigart, Field Test Teacher; Mr. Dennis Toren, Field Test Teacher.

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Illinois State Board of Education

Department of Adult, Vocational and Technical Education
Research and Development Section

Product Abstract

1. Title of material COMPETENCY BASED HORTICULTURE: Floriculture

2. Date material was completed June 30, 1981

3. Please check one: New material X Revised material ___

4. Originating agency College of DuPage
Address Glen Ellyn, Illinois Zip Code 60137

5. Name(s) of developer(s) Susan E. Bates - Ornamental Horticulture Department
Address College of DuPage, Glen Ellyn, Illinois Zip Code 60137

6. Developed pursuant to Contract Number 1) R-33-21-D-0542-317 2) R-33-10-X-0442-317

7. Subject Matter (Check only one according to USOE Code):

USOE Code

X 01 Agricultural Education
___ 03 Business and Office Education
___ 04 Distributive Education
___ 07 Health Occupations Education
___ 09 Home Economics Education
___ 10 Industrial Art Education
___ 16 Technical Education
___ 17 Trade and Industrial Education
___ 22 Cooperative Education
___ Career Education
___ Other (Specify) ___

8. Education Level:

___ Pre-K Thru 6
X Post-Secondary
___ Administrator (Pre-Service)
___ 7-8
___ Adult
X 9-10
___ Teacher (Pre-service)
___ Other (Specify) ___
X 11-12

9. Intended for Use By:

___ Student
___ Teacher Educator
___ Other (Specify) ___
X Classroom Teacher
___ Guidance Staff
___ Local Administrator
___ State Personnel

10. Student Type:

____ Regular
____ Limited English Proficiency
____ Disadvantaged
____ Handicapped
X Other (Specify) Vocational

11. Medium and Format of Materials:

X HARDCOPY
No. of pages 201
____ Paper bound
____ Hard bond
X Loose-leaf
Photos: Yes ____ No X
Diagrams: Yes ____ No X

____ VIDEOTAPE
____ Minutes
____ B & W
____ Color
____ inches

____ FILM
____ Minutes
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____ MICROFICHE
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____ SLIDES
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____ FILM STRIPS
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____ Automatic synch
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Specify:
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12. Availability:

____ One copy free
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16. General Description (State the general objective and suggested method of use. Summarize the content and tell how it is organized. Continue on back of this sheet or on another sheet, if necessary.):

A competency-based guide developed for use by secondary/post-secondary Ornamental Horticulture instructors who wish to teach their students floriculture as it applies to the Illinois floriculture industry.

17. Person Completing this Abstract: Susan E. Bates

Full Address:
Ornamental Horticulture Department
College of DuPage
Glen Ellyn, Illinois Zip 60137

Contents

Maintenance and Repairs

Sharpen Hand Tools 1
Grease Equipment 3
Oil Electric Motors 5
Clean Spray Equipment 7
Repair Spray Equipment 9
Locate and Report Malfunctions in Fertilizer Injection System 11
Repair Malfunctions in Irrigation System 13
Make Minor Repairs on Irrigation Supply Pump 15
Replace Damaged Support Wired and Sections of Seran 17
Repair Wooden Greenhouse Benches and Superstructure 19
Paint Greenhouse Frames and Equipment 22
Replace and Glaze Broken Greenhouse Glass 24
Replace Plastic Covering on Greenhouse Structures 26

Field Soils

Plow Land 28
Disk Land 30
Level or Smooth Fields 32
Apply Lime/Dolomite 34
Pasteurize Field Soils with Chemicals 36

Media Mixes

Shred Planting Media 38
Screen Planting Media 40
Mix Media Materials 42
Pasteurize Media with Steam 44
Pasteurize Media with Chemicals 47
Take Soil Samples 50
Determine pH Levels of Soil Samples 52
Determine Soluble Salt Levels of Soil Samples 54
Mix Fertilizers into Media 56
Mark Off Planting Spaces 58

Planting and Propagating Plants

Label Plants or Cuttings 60
Plant Seeds 62
Transplant Seedlings 65
Plant Bulbs in Beds 67
Force Bulbs in Pots 69
Take Cuttings 72
Stick Cuttings 75
Set Time Clocks for Automatic Mist System 78
Remove Rooted Cuttings 80
Transplant Cuttings 83
Package Cuttings for Shipment 85
Regulate Temperature of Cold Storage Unit 87

Cultural and Environmental Control Practices

Pinch Flowering Plants 89
Disbud Flowering Plants 91
Prune Plants 93
Apply Growth Regulating Chemicals 95
Install Shade Cloth 97
Apply Shading Compound to Greenhouse Glass 100
Install Black Cloth to Regulate Photoperiod 102
Install Supplemental Lighting to Regulate Photoperiod 104
Set Time Clocks to Regulate Lighting 106
Adjust Automatic Cooling System 108
Cultivate Soil with a Rototiller 111
Aerate Compacted Soils in Beds 113
Stake and Tie Plants 116
Raise Bedwire or Fibered Plastic 118
Apply Granular Fertilizer 120
Apply Liquid Fertilizer 123
Remove Weeds Manually from Potted Plants 126
Remove Weeds Manually from Floral Crops 129
Remove Weeds with Tractor Drawn Mechanical Cultivators 132

Irrigation Practices

Hand Water Plants 135
Apply Water in Ditches or Furrows 137
Pump Water for Irrigation 139
Set Time Clocks for Automatic Irrigation System 141
Regulate Trickle or Ooze Irrigation System 143

Plant Pest and Disease Control

Report Disease and Insect Damage 145
Remove Dead and Diseased Plant Parts 147
Remove Diseased Plants 149
Mix Chemicals 151
Apply Chemicals 154
Identify and Report Spray Damage 157
Set Out Poison Bait 159

Harvesting Crops

Cut Flowers 161
Count and Bunch Flowers 163
Count and Bunch Fern 165
Prepare and Place Cut Flowers in Water or Preservative 167
Load Potted Plants for Transporting 169
Remove Saleable Plants from Beds or Benches 171
Remove Bedwire or Fibered Plastic from Harvested Areas 173
Dig Bulbs or Corms 175
Clean and Size Harvested Bulbs or Corms 177
Dry Harvested Bulbs or Corms 179
Treat Bulbs or Corms to Control Disease 181

Packaging, Storage and Shipment

Inventory Plants 184
Grade Potted Flower or Foliage Plants 187
Grade Cut Flowers 189
Place Plant Materials in Storage 191
Prepare Invoices and Shipping Labels 193
Package Orders for Shipment 195
Assemble Shipping Cartons 200

FLORICULTURE MASTER RESOURCE LIST

MISCELLANEOUS

BOOKS:

Baker, Kenneth Frand ed. *The U.C. System for Producing Healthy Container-Grown Plants Through the Use of Clean Soil, Clean Stock, and Sanitation*. Berkeley, California: AGricultural Experiment Station, 1961.

Ball, George J. *The Ball Red Book*. West Chicago, Illinois: George J. Ball, Inc., 1975.

Florist's Guide to Fresh Flower Care. Southfield, Michigan: Florists' Transworld Delivery Association.

Hartman, Hudson T. and Kester, Dale E. *Plant Propagation: Principles and Practices*. 2nd ed. Englewood Cliffs, N.J.: Prentice-Hall, 1968.

Israelson, O.W. and Hansen, V.E. *Irrigation Principles and Practices*. New York, New York: Wiley, 1962.

Laurie, A. and Ries, V. *Floriculture: Fundamentals and Practices*. New York, New York: McGraw-Hill, 1950.

Masterlerz, J.W. *Bedding Plants: A Manual on the Culture of Bedding Plants as a Greenhouse Crop*. University Park, Pennsylvania: Pennsylvania Flower Growers, 1976.

Masterlerz, J.W. *The Greenhouse Environment*. New York, New York: John Wiley and Sons, 1977.

Nelson, K.S. *Greenhouse Management for Flower and Plant Production*. Danville, Illinois: Interstate, 1973.

Nelson, K.S. *Flower and Plant Production in the Greenhouse*. Danville, Illinois: Interstate, 1966.

Nelson, Paul V. *Greenhouse Operation and Management*. Reston, Virginia: Reston Publishing Co., Inc., 1978.

Thomson, William Thomas. *The Ornamental Pesticide Application Guide*. Davis, California: Thomson Publications, 1969.

SLIDESETS:

Horst, R.K. and Schmohe, Daniel. 'Identification of Greenhouse Diseases and Their Control'. Ithaca, New York: Instructional Materials Service, Cornell University, 1975.

FLORICULTURE RESOURCES - ILLINOIS

Available from :

Vocational Agriculture Service
College of Agriculture
University of Illinois
434 Mumford Hall
Urbana, Illinois 61801

SLIDEFILMS AND SLIDESETS:

No.	
600	Propagation by Air Layering
601	Garden Flowers-Annuals, Pt. 1
601(supp)	Practice Set for Garden Flowers
602	Garden Flowers-Annuals, Pt. 2
602(supp)	Practice Set for Garden Flowers, Pt.2
604	Diseases of Garden Flowers
610	Foliage Plant Identification, Pt. 1
610(supp)	Practice Set for Foliage Plant Identification, Pt.1
611	Foliage Plant Identification, Pt. 2
611(supp)	Practice Set for Foliage Plant Identification, Pt.2
612	Foliage Plant Identification, Pt.3
612(supp)	Practice Set for Foliage Plant Identification, Pt.3
613	Planting and Caring of Hanging Baskets
708	Soil Color
791a	Weed Identification
791a(supp)	Practice Set Weed Identification
800	Identification of Weed Seedlings-Broadleaves, Pt.1
801	Identification of Weed Seedlings-Broadleaves, Pt.2
803	Identification of Weed Seedlings-Grasses
811	The Wicked World of Weeds
1107	Air Pollution Damage to Vegetation
1108-1.1	Understanding and Safe Use of Pesticides
1108-1.2	Selecting and Handling Pesticides
1108-1.3	Calibrating and Applying Pesticides Safely

SLIDEFILMS AND SLIDESETS con't.:

No.	
1108-2.2	Identifying Common Insect Pests

SUBJECT-MATTER UNITS:

No.	
3015	Spray Painting
3039	Glazing
3044	Color Code for Shop Safety
4001	Collecting and Preparing Soil Samples for Testing
4002a	pH Test for Soil Acidity
4003b	Testing Soils for Phosphorus
4004b	Determining Available Potassium in Soils
4005	Nature of Soil Acidity and Major Plant Nutrients
4008a	Recommended Potassium Fertilizers
4010a	Planning a Fertilizer Program
4011a	Hunger Signs in Crops
4028	Soil Structure
4029	Soil Color
4030	Soil Texture
4045a	Handling and Using Pesticides Safely
4052	Understanding Soils
5006	Producing Plants by Asexual Propagation
5007	Growing Plants Indoors
5010a	Growing Flowering Annuals
5011	Poinsettias - Care and Propagation
5013	Producing Poinsettias Commercially
5014	Growing Lilies
5019	Care of Flowering Pot Plants in the Home

TRANSPARENCIES AND STUDY GUIDES:

Soil Testing and Fertility
Safe Use of Pesticides

FLORICULTURE RESOURCES - CALIFORNIA

Available from:

Vocational Education Productions
California Polytechnic State University
San Luis Obispo, California 93407

SLIDESET:

Insect Identification Learning Kit

SOUND FILMSTRIPS:

No.	
1-204-132	Elements of Pruning
1-204-133	Propagating Ornamental Plants
1-204-134	Growing Media for Ornamental Plants
1-240-231	Bedding Plant Production
1-240-233	Care and Handling of Cut Flowers & Foliage
1-240-234	Greenhouse Maintenance
	Plant Identification: Annuals, Perennials, House Plants

MANUALS:

No.	
1-210-820	Growing Container Plants

16

Available from:

Career Aids, Inc.
8950 Lurline Avenue, Dept. T-4
Chatsworth, California 91311

Soil Testing and Plant Propagation

How to Collect and Test Soil Samples
How To Root Plant Cuttings
How to Perform Germination and Viability Tests on Seeds
How to Safely Use Sprays and Dusts on Plants
An Introduction to Plant Pollination Techniques

Greenhouse Skills

How to Plant Seedlings
How to Transplant Seedlings into Flats
How to Transplant Seedlings from Flats to Pots
How to Water Greenhouse Plants
How to Fertilize Greenhouse Plants

FLORICULTURE RESOURCES - GEORGIA

Available from:

The University of Georgia
Department of Agricultural Education
630 Aderhold Hall
Athens, GA 30602

Controlling Insects of Greenhouse Plants

Available from:

AAVIM
Engineering Center
Athens, Georgia 30602

Applying Pesticides
Recognizing Pests and Pesticides
Selecting Pesticides
Handling Pesticides Safely
Type and Size of Sprayer to Use
Operating Sprayers
Applying Pesticides

FLORICULTURE RESOURCES - IDAHO

Available from:

University of Idaho
Moscon, Idaho   63843

Pesticides for Plant Disease Control - by Harry Fenwick

FLORICULTURE RESOURCES - KENTUCKY

Available from:

Competency Based Vocational Education Unit
2008 Capital Plaza Tower
Frankfort, KY 40601
Attention: Donna G. Brown

MODULES:

No.	
GG-1	Taking Soil Samples
GG-2	Developing Fertilization Schedules
GG-6	Sterlizing Soil
GG-9	Applying Fertilizer
GG-10	Cleaning and Lubricating Fertilizer Applicators
GG-47	Servicing Irrigation Systems
GG-48	Repairing Faucets
GG-51	Watering Plants
GG-68	Purchasing and Storing Chemical Supplies
GG-69	Controlling Insects on Plants
GG-71	Applying Weed Killing Compounds
GG-72	Applying Chemicals to Diseased Plants
GG-73	Purchasing and Transporting Plants, Equipment, and Supplies
FD-4	Conditioning Cut Flowers
FD-5	Watering Potted Plants
FD-6	Fertilizing Plants
FD-35	Dressing Potted Plants
NP-4	Treating Soil with Soil Fumigants
NP-5	Sterilizing Soil with Liquids and Chemicals
NP-6	Planting Bulbs
NP-7	Planting Seed
NP-8	Transplanting Seedlings to Pots
NP-10	Taking Cuttings (Softwood and Evergreen Wood)
NP-15	Labeling Planted Specimens
NP-18	Glazing Windows

MODULES con't.:

No.	
NP-10	Painting Greenhouse or Nursery Structures
NP-20	Repairing Faucest
NP-21	Repairing Leaky Water Pipes
NP-22	Installing Irrigation Equipment
NP-23	Watering Plants
NP-25	Fertilizing Container Plants
NP-27	Setting and Adjusting Thermostats
[illegible]-28	Forcing Potted Plants to Bloom at Seasonal Times
NP-30	Controlling Light Requirements by Shade Cloth
NP-31	Controlling Growth Rate by Applying Retardant
NP-48	Fumigating a Greenhouse
NP-49	Cultivating Nursery Crops
NP-52	Mixing Chemicals
NP-53	Controlling Insects on Plants
NP-55	Applying Weed Killer
NP-56	Applying Chemicals to Diseased Plants
NP-58	Controlling Animal Pests
NP-59	Removing Diseased Plants
NP-63	Grading Plants
NP-66	Removing Dead and Diseased Blooms and Plant Parts
NP-68	Packaging and Loading Orders
NP-73	Replacing Electrical Light Switches
NP-74	Repairing Extension Cords
NP-75	Cleaning and Oiling Electric Motors
NP-76	Replacing a Greenhouse Fan
NP-77	Servicing Gas Heater Burners

FLORICULTURE RESOURCES - MICHIGAN

Available from:

Cooperative Extension Service
Michigan State University
East Lansing, Michigan

SLIDESETS:

Asexual Propagation of Plants

BULLETINS:

Care of Selected Foliage Plants - Extension Bulletin HM-90
Peats for Soil Improvement and Soil Mixes - Extension Bulletin E-516
Propagation of Indoor Plants
Proper Care of Cut Flowers - Extension Bulletin E-558
Sampling Soils - Extension Bulletin E-498
Secondary and Micronutrients - Extension Bulletin E-486

BOOKS:

Holland Bulb Forcers' Guide

FLORICULTURE RESOURCES - NEW YORK

Available from:

The University of The State of New York
The State Education Department
Bureau of Occupational and Career Curriculum
Albany, New York 12234

MODULES:

No.	
01.0503-01	Introduction to Growing Greenhouse Crops
01.0503-02	Growing Bedding Plants
01.0503-03	Growing Specialized Greenhouse Holiday Crops
01.0505-02	Asexual Plant Propagation
01.0505-03	Plant Propagation from Seed
01.0599-01	Controlling Insects, Diseases, and Fertilization
01.0599-02	Preparing and Maintaining Ornamental Horticulture Soils
01.0599-07	Scheduling Greenhouse Crop Production
01.0599-08	Preparing Flowers for Sale

FLORICULTURE RESOURCES - OHIO

Available from:

Ohio Agricultural Education Curriculum Materials Service
The Ohio State University
Room 254
2120 Fyffe Road
Columbus, Ohio 43210

SLIDES AND SCRIPT:

Greenhouses and Related Structures
Foliage Plants
Annuals
Cut Flowers
Design Greens
Flowering Potted Plants
Soil and It's Properties
Diseases of Greenhouse Flower Crops
Common Insects of Greenhouse Crops

MANUALS:

Some Common Types of Insects
Weed Control - Cultural and Chemical
The Greenhouse Worker

TRANSPARENCIES:

Weed Control

Available from:

MANUALS:

Greenhouse Crop Production

Available from:

Vocational Instructional Services
F.E. Box 182
Texas A & M University
College Station, Texas 77843

MANUALS:

Greenhouse Operation and Maintenance
Propagating Horticulture Plants

FLORICULTURE RESOURCES - WEST VIRGINIA

Available from:

Vocational Curriculum Laboratory
Cedar Lakes Conferences Center
Ripley, West Virginia 25271

MODULES:

No.	
02	Soil Preparation
03	Seeds
04	Rooting and Propagation
05	Container Plants
06	Transplanting
07	Fertilizer
08	Greenhouse Control
09	Disease and Pest Control
10	Sale Preparation
11	Special Duties

FLORICULTURE RESOURCES - WISCONSIN

Available from:

University of Wisconsin
Cooperative Extension Service
Madison, Wisconsin

BULLETINS:

Circular 511.	Flowering Potted Plants
Circular 100.	Success With Bedding Plants
Circular 150.	Understanding Pesticide Labels

Maintenance and Repairs

- Sharpen Hand Tools, *page 1*
- Grease Equipment, *page 3*
- Oil Electric Motors, *page 5*
- Clean Spray Equipment, *page 7*
- Repair Spray Equipment, *page 9*
- Locate and Report Malfunctions in Fertilizer Injection System, *page 11*
- Repair Malfunctions in Irrigation System, *page 13*
- Make Minor Repairs on Irrigation Supply Pump, *page 15*
- Replace Damaged Support Wired and Sections of Seran, *page 17*
- Repair Wooden Greenhouse Benches and Superstructure, *page 19*
- Paint Greenhouse Frames and Equipment, *page 22*
- Replace and Glaze Broken Greenhouse Glass, *page 24*
- Replace Plastic Covering on Greenhouse Structures, *page 26*

Maintenance and Repairs

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: SHARPEN HAND TOOLS

Performance Objective	Learning Activities	Evaluation	Resources
Given from 4-6 hand tools including a knife, hoe, spade and pruning shears, and a work bench with a vise and the necessary files, emery wheels, whetstones or other required equipment, sharpen the assigned hand tools. For satisfactory performance, tools must be sharpened to a keen cutting edge, and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	KENTUCKY GG-27 'Servicing Hand Tools' (module)
	3) Group discussion - methods of sharpening tools, safety precautions	3) Participation	NEW YORK 01.0599-06 'Operation and Maintenance of Horticultural Equipment' (module)
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	Floriculture Worker Performance Guide

1. Select the appropriate pieces of equipment for sharpening a given tool.

2. Practice all necessary safety precautions.

3. Sharpen tools to achieve proper blade sharpness and angle edge of the blade.

4. Clean all tools and equipment used in the sharpening process and return them to their proper place in storage.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: GREASE EQUIPMENT

Performance Objective	Learning Activities	Evaluation	Resources
Given the necessary grease guns, grease, one or more tractors or other pieces of equipment requiring lubrication, and operator's manuals, grease the equipment. For satisfactory performance, all points listed in the operator's manual as needing to be greased, should be greased, and work must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY
	2) Read subject-matter units	2) Notes	GG-10 'Cleaning and Lubricating Fertilizer Applicators' (module)
	3) Review operator's manuals	3) Notes	
	4) Group discussion - proper greasing of equipment, where to grease, frequency of greasing	4) Participation	NP-75 'Cleaning and Oiling Electric Motors' (modules) NEW YORK
	5) Demonstration - floriculture worker/instructor	5) Attendance	01.0599-06 'Operation and Maintenance of Horticultural Equipment' (module)
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	Operator's Manuals Floriculture Worker Performance Guide

Performance Guide GREASE EQUIPMENT

1. Check manual for location of zirks and places to be greased.
2. Locate fittings and wipe off with cloth.
3. Apply correct type of grease to each zirk or other place to be greased.
4. Oil any area which manual specifies is to be oiled.
5. Wipe off extra oil and grease with cloth.
6. Return tools and equipment to storage area.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: OIL ELECTRIC MOTORS

Performance Objective	Learning Activities	Evaluation	Resources
Given an electric motor, an operator's manual, a suitable applicator, the required oil, a clean cloth and any other tools or equipment which might be needed, oil the motor. For satisfactory performance, the motor must be oiled in accordance with the specifications included in the operator's manual and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	KENTUCKY NP-75 'Cleaning and Oiling Electric Motors' (module)
	3) Review manufacturer's instructions and maintenance recommendations	3) Notes	
	4) Group discussion - proper oiling of electric motors, frequency of lubrication	4) Participation	NEW YORK 01.0599-06 'Operation and Maintenance of Horticulture Equipment'
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	Manufacturer's Instructions Performance Guide

OIL ELECTRIC MOTORS

1. Check operator's manual to identify all cups and other receptacles requiring oil.
2. Apply oil to the appropriate areas of motor.
3. Use cloth to remove excess oil.
4. Return oil and other required items to storage.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: CLEAN SPRAY EQUIPMENT

Performance Objective	Learning Activities	Evaluation	Resources
Given spray equipment to be cleaned, suitable detergent, an air hose, water and a dry cloth, clean all parts of the spray equipment including hoses, tank, nozzles and filters. For satisfactory performance, spray equipment will be free of all trash, sediment, corrosive acids, and alkali residues. Corrosive-prone parts will be coated with a film of oil and all work will meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	GEORGIA 'Operating Sprayers'
	3) Review manufacturer's instructions for chemical(s) used and spray equipment	3) Notes	'Type and Size of Sprayers to Use'
	4) Group discussion - importance of cleaning spray equipment, methods of cleaning	4) Participation	Manufacturer's Instructions Performance Guide
	5) Group/Independent Project-perform maintenance check on available spray equipment	5) Performance Guide/ Instructor Approval	
	6) Complete Performance Objective		

Performance Guide CLEAN SPRAY EQUIPMENT

1. Make sure all necessary materials are available.
2. Flush clean water through unit to reduce concentration of chemical.
3. Flush again.
4. Disassemble nozzles and filters, and wash entire unit thoroughly to remove all chemical dirt.
5. Dry each part thoroughly and coat with oil.
6. Reassemble spray equipment and store in dry place.
   CAUTION: When spray equipment is used infrequently, nozzles and accessory parts should be kept in a small can or bottle containing diesel fuel. This should guarantee that they will function effectively at the time of use.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: REPAIR SPRAY EQUIPMENT

Performance Objective	Learning Activities	Evaluation	Resources
Given a piece of spray equipment with nonfunctional hoses, pipes, lines, and/or nozzles, the necessary tools and replacement parts, repair the equipment. For satisfactory performance, the spray equipment will function properly and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List GEORGIA 'Operating Sprayers' NEW YORK 01.0599-06 'Operation and Maintenance of Horticultural Equipment' Manufacturer's Instructions Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Review manufacturer's instructions	4) Notes	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

Performance Guide

REPAIR SPRAY EQUIPMENT

1. Assess damage to spray equipment.

2. Remove damaged or non-functional hoses, pipes, or nozzles.
   a. Splice or straighten, couple or replace damaged pipes.
   b. Clean or replace clogged or damaged spray nozzles.

3. Operate spray equipment to make sure it is operational and especially, that it emits a uniform spray when repairs have been made.

4. Clean and return parts and spray equipment to storage.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: LOCATE AND REPAIR MALFUNCTIONS IN FERTILIZER INJECTION SYSTEM

Performance Objective	Learning Activities	Evaluation	Resources
Given a malfunctioning system for injecting liquid fertilizer into an automatic irrigation system, liquid fertilizer, dye and any other necessary equipment, locate and report any malfunctions in the system. For satisfactory performance, all malfunctions must be located and reported and must agree with the instructor's findings.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY GG-10 'Cleaning and Lubricating Fertilizer Applicators' (module) Manufacturer's Instructions Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group discussion - common malfunctions in fertilizer injection systems, repair techniques	3) Participation	
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	

1. Confirm location of system.
2. Locate the malfunction.
   - a. Apply a suitable dye to the water in the injection tank.
   - b. Take water samples in a clear glass bottle and compare the samples with the water in the injection tank. When the color of water from the injector system varies appreciable from the injector water (lighter in color) the system is clogged at some point.
   - c. Several checks of the water in the system should pinpoint the problem.
3. Report the malfunction and its location to immediate supervisor or instructor.

47

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: REPAIR MALFUNCTIONS IN IRRIGATION SYSTEM

Performance Objective	Learning Activities	Evaluation	Resources
Given a malfunctioning sprinkler or mist irrigation system, the necessary tools, equipment, and repair parts, check out the system, repair/replace any broken pipes, sprinkler heads, mist heads, valves and/or gaskets. For satisfactory performance, all leaks, clogged heads and faulty gaskets and valves will be repaired and work will meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY GG-47 'Servicing Irrigation Systems' (module) NP-21 'Repairing Leaky Water Pipes' (module) TEXAS 'Greenhouse Operation and Management' (manual) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Review manufacturer's instructions and repair manual	3) Notes	
	4) Group discussion - types of pipe materials, sprinkler heads, mist heads, valves, and their maintenance	4) Participation	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

1. Operate the system to identify malfunctions.
2. Clean any clogged sprinkler or mist heads by routing them out with a welder's tip cleaner or wire.
3. Replace damaged pipes, valves, sprinkler heads, mist heads or faulty gaskets.
4. Operate the system to make sure all necessary repairs and adjustments have been made.
5. Clean all tools and equipment and return them to storage.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: MAKE MINOR REPAIRS ON IRRIGATION SUPPLY PUMP

Performance Objective	Learning Activities	Evaluation	Resources
Given a malfunctioning electrically powered irrigation supply pump needing minor repairs, necessary tools and equipment, repair the pump. For satisfactory performance, the pump must operate properly, be repaired according to recommendations given in the manufacturer's manual, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY GG-47 'Servicing Irrigation Systems' (module) NP-75 'Cleaning and Oiling Electric Motors' (module) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Review manufacturer's instructions and repair manual	3) Notes	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

Performance Guide

MAKE MINOR REPAIRS ON IRRIGATION SUPPLY PUMP

1. Use meter or test lamp to check electrical system and identify problems.
    a. Attach meter or lamp to wiring to observe presence or absence of electricity.
    b. Wiring for damage such as breaking and short circuits.
    c. Observe fuses or gound current interrupters for burn-out or trippage.

2. Inspect pump for leaking seals.
    a. Inspect intake seals for air leakage.
    b. Inspect impeller shaft and casing for water or air leakage.
    c. Inspect output seals for water leakage.

3. Repair or replace electricity.
    a. Replace wiring completely or splice and insulate broken or disconnected wiring.
    b. Replace fuses or reset ground current interrupter.

4. Replace leaking seals.
    a. Disassemble points of leakage.
    b. Remove old seals
    c. Clean seal seats
    d. Position new seals
    e. Reassemble pump.

5. Operate pump and inspect for problems

6. Return tools and equipment to storage.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: REPLACE DAMAGED SUPPORT WIRES AND SECTIONS OF SERAN

Performance Objective	Learning Activities	Evaluation	Resources
Given a greenhouse where support wires and sections of seran are missing or damaged, the necessary tools and equipment, repair the support wires and sections of seran. For satisfactory performance, support wires must be securely attached to the greenhouse framework and provide the necessary support, the seran must be replaced neatly so it will not tear, and all work must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Review manufacturer's instructions and repair recommendations	2) Notes	Manufacturer's Instructions
	3) Demonstration - floriculture workers/instructor	3) Attendance	Floriculture Worker
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	Performance Guide

REPLACE DAMAGED SUPPORT WIRES AND SECTIONS OF SERAN

1. Support Wires
   a. Examine the designated greenhouse area to determine the length and number of wires requiring replacement.
   b. Measure and cut wire for replacement.
   c. Secure one end of each wire to be used as a replacement to the framework of the greenhouse.
   d. Stretch each wire to desired tightness and secure it.

2. Seran
   a. Measure sections of damaged seran and cut the necessary pieces of seran to replace the worn or damaged area.
   b. Stretch seran to allow for expansion and tack in place
   c. Secure seran by use of an overlay of lath or other materials to prevent tearing

3. Clean tools and return them along with any unused materials to storage when the task has been completed.

56

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: REPAIR WOODEN GREENHOUSE BENCHES AND SUPERSTRUCTURE

Performance Objective	Learning Activities	Evaluation	Resources
Given a wooden greenhouse superstructure and benches needing repair or replacement, the necessary tools and materials, make the repairs. For satisfactory performance, repairs must be sturdy, restore the benches to use and all items on the instructor checklist must be rated 'acceptable'.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 3009a 'Using the Carpenter's Square' (subject-matter unit) TEXAS 'Greenhouse Operation and Management' (manual) Construction Manuals Floriculture Worker Performance Guide Instructor Checklist
	2) Read subject-matter units	2) Notes	
	3) Review construction manuals	3) Notes	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Checklist	

Performance Guide

REPAIR WOODEN GREENHOUSE BENCHES AND SUPERSTRUCTURE

1. Identify the repairs needed.

2. Determine the nature and extent of the repairs needed.

3. GREENHOUSE BENCHES

   a. remove plants and media from benches to be repaired

   b. square off and mark the area to be repaired

   c. remove damaged portion of bench

   d. measure and fit new portion to bench-replacement portion should be made of treated wood

4. SUPERSTRUCTURE

   a. brace superstructure prior to removing wooden portions

   b. remove any broken, rotten, misshapen, or worn portions

   c. measure and fit replacement part - replacement portion should be made of treated wood

   d. remove braces from superstructure

5. Clean area and return all tools and unused materials to storage.

59

ACCEPTABLE

1. Lumber and other materials available for making the repairs were properly utilized.

2. Measurements were carefully taken before any materials were procured and cut.

3. All materials procured were of proper size, type and dimension.

4. All other work done was completed in the time allotted and met requirements for quality and durability.

5. Necessary safety precautions were followed at all times in making the repairs.

6. Tools, equipment and left over materials were properly cleaned and stored following use.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: PAINT GREENHOUSE FRAMES AND EQUIPMENT

Performance Objective	Learning Activities	Evaluation	Resources
Given greenhouse frames, benches and other equipment to be painted, paint, brushes, spray gun, wire brush, sandpaper and other necessary tools and equipment, scrape and paint the greenhouse frame and benches. For satisfactory performance, all painted surfaces must be attractive, protected against rusting, corrosion and rotting, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS
	2) Read subject-matter units	2) Notes	3015 'Spray Painting' (subject-matter unit)
	3) Group discussion - paint types/colors and their uses on various equipment, i.e. heat pipes, frames, etc.	3) Participation	3044 'A Color Code for Shop Safety' (subject-matter unit) KENTUCKY
	4) Group discussion - OSHA safety color codes	4) Participation	NP-19 'Painting Greenhouse or Nursery Structures' (module)
	5) Group discussion - proper disposal of paint containers	5) Participation	Manufacturer's Instructions OSHA Safety Color Codes
	6) Demonstration - floriculture worker/instructor	6) Attendance	Floriculture Worker Performance Guide
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

1. Identify items which are to be painted.
2. Prepare items to be painted by use of steel wool, wire brush or other suitable abrasive to remove loose paint, rust and corrosion.
3. Determine type and color of paint to be used on items being painted.
4. Mix paint according to color chart, if mixing is required to get desired color.
5. Add thinner or thinning agent if required and stir thoroughly.
6. Apply paint with spray gun or other suitable applicator.
7. Clean all applicators and other equipment following use.
8. Dispose of empty containers and trash properly.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: REPLACE AND GLAZE BROKEN GREENHOUSE GLASS

Performance Objective	Learning Activities	Evaluation	Resources
Given a greenhouse with broken glass, replacement glass, glazing compound and all necessary tools, replace broken glass. For satisfactory performance, new glass must be firmly fitted, well secured, glazing must prevent leakage, and all work must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 3039 'Glazing' (subject-matter unit) KENTUCKY NP-18 'Glazing Windows' (module) Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Demonstration - floriculture worker/instructor	3) Attendance	
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	

Performance Guide REPLACE AND GLAZE BROKEN GREENHOUSE GLASS

1. Locate broken glass.
2. Place ladder in position on roof and remove bar cap.
3. Remove broken glass.
4. Remove old glazing compound.
5. Apply glazing compound to bar.
6. Position new glass properly and firm down in glazing compound.
7. Replace bar cap.
8. Return all equipment to proper storage.

Floriculture Unit: MAINTENANCE AND REPAIRS

Competency Task: REPLACE PLASTIC COVERING ON GREENHOUSE STRUCTURES

Performance Objective	Learning Activities	Evaluation	Resources
Given a greenhouse with torn or aged plastic covering, new plastic covering and necessary tools and equipment, replace the plastic covering. For satisfactory performance, the new covering must be properly stretched, firmly secured, neat, and all work must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	ILLINOIS 680 'Greenhouses-Uses and Design' (slidefilm)
	3) Read subject/matter units	3) Notes	
	4) Review manufacturer's instructions	4) Notes	OHIO 'Greenhouses and Related Structures' (slides and script)
	5) Group discussion - various types of plastic coverings, affect of ultra-violet rays on plastic, frequency changing plastic	5) Participation	TEXAS 'Greenhouse Operation and Management'
	6) Field trip - local greenhouse recovering plastic greenhouse(s)	6) Attendance	Manufacturer's Instructions
	7) Demonstration - floriculture worker/instructor	7) Attendance	Local Greenhouse Floriculture Worker
	8) Complete Performance Objective	8) Performance Guide/ Instructor Approval	Performance Guide

1. Identify greenhouse area or sections in which plastic is to be replaced.
2. Remove torn or worn plastic and dispose of appropriately.
3. Remove old staples, nails, etc. and smooth any rough or splintered wooden edges.
4. Cut new plastic to fit.
5. Install new plastic.
6. Return tools and left over materials to storage.

Soil and Media Preparation

Field Soils

- Plow Land, *page 28*
- Disk Land, *page 30*
- Level or Smooth Fields, *page 32*
- Apply Lime/Dolomite, *page 34*
- Pasteurize Field Soils with Chemicals, *page 36*

Field Soils

Floriculture Unit: SOIL AND MEDIA PREPARATION - FIELD SOILS

Competency Task: PLOW LAND

Performance Objective	Learning Activities	Evaluation	Resources
Given a designated area of land to be plowed, a farm tractor with 3 point hook up and a plow of appropriate size, plow the land. For satisfactory performance, plowing must be uniform depth throughout the field, there must be no skips, and plowing must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	ILLINOIS 3040 'Preventing Tractor Overturns' (subject-matter unit)
	3) Review tractor safety transparencies	3) Notes	'Tractor Safety Transparencies' (transparencies)
	4) Read manufacturer's instructions and safety regulations	4) Notes/ability to operate tractor safely	Manufacturer's Instructions
	5) Demonstration - floriculture worker/instructor	5) Attendance	Floriculture Worker Performance Guide
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

Performance Guide PLOW LAND

1. Identify the land area to be plowed.
2. Perform service check on tractor and plow.
3. Hook plow to tractor.
4. Adjust the plow to meet the following requirements:
    a. plow is adjusted to desired depth and share runs parallel to the center line of the tractor.
    b. the landside of the plow is vertical or as nearly vertical as possible.
5. Mark off area to be plowed into 'lands' or areas of size which allow for the best economy in the use of fuel and time.
6. Determine plowing pattern to be used and plow area.
7. Wash mouldboard and plow shares following use and coat them with oil to prevent rust prior to storage.

Floriculture Unit: SOIL AND MEDIA PREPARATION - FIELD SOILS

Competency Task: DISK LAND

Performance Objective	Learning Activities	Evaluation	Resources
Given a tractor with a 3 point hitch, land to be disked and a standard disk harrow, disk the area assigned. For satisfactory performance, disking will be uniform throughout the field, the soil will be free of large clods/clumps of sod, left in a level friable condition, and disking will meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	ILLINOIS 3040 'Preventing Tractor Overturns' (subject-matter unit)
	3) Review tractor safety transparencies	3) Notes	'Tractor Safety Transparencies' (transparencies)
	4) Read manufacturer's instructions and safety regulations	4) Notes/ability to operate tractor safely	Manufacturer's Instructions
	5) Demonstration - floriculture worker/instructor	5) Attendance	Floriculture Worker
	6) Complete Performance Objective	6) Performance Guide/Instructor Approval	Performance Guide

75

76

Performance Guide DISK LAND

1. Perform service check on tractor and disk.

2. Connect disk to tractor using 3 point hitch.

3. Adjust the disk to the proper cutting angle and depth depending upon condition of the land.

4. Double disk the land, if necessary, making certain that overfall is ½ the width of disk.

5. Store unit under shelter following the coating of the disks with oil.

Floriculture Unit: SOIL AND MEDIA PREPARATION - FIELD SOILS

Competency Task: LEVEL OR SMOOTH FIELDS

Performance Objective	Learning Activities	Evaluation	Resources
Given a field to be smoothed and leveled, level and smooth the designated field. For satisfactory performance, the entire field will be free of hummocks and potholes, sufficiently smooth for planting the given crop, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	ILLINOIS 3040 'Preventing Tractor Overturns' (subject-matter unit)
	3) Review tractor safety transparencies	3) Notes	'Tractor Safety Transparencies' (transparencies)
	4) Read manufacturer's instructions and safety regulations	4) Notes/ability to operate tractor safely	Manufacturer's Instructions
	5) Demonstration - floriculture worker/instructor	5) Attendance	Floriculture Worker
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	Performance Guide

1. Identify area to be smoothed and leveled.

2. Service tractor and leveling equipment.

3. Drive or otherwise convey tractor and equipment to assigned area.

4. Adjust the leveling equipment to the following standards:
   a. The leveler pulls evenly and trails directly behind the tractor
   b. The cutting blade is level.
   c. The set of the blade is low enough to remove the high areas but not too low as to cause pile up of soil in front of the blade or cutting mechansim.

5. Work the field in one direction over its entirety.

6. Work the field again at right angles to the direction of the first leveling if necessary to get it sufficiently level and smooth.

7. Return unit to storage after use.

Floriculture Unit: SOIL AND MEDIA PREPARATION - FIELD SOILS

Competency Task: APPLY LIME/DOLOMITE

Performance Objective	Learning Activities	Evaluation	Resources
Given either hydrated lime or dolomitic lime, and a suitable applicator, apply the lime to the soil. For satisfactory performance, lime will be applied evenly at the prescribed rate (see soil test report) and application will meet instructor approval.	1) Read appropriate selections from Master Resource List 2) Read subject-matter units 3) Group discussion - various lime products and their application 4) Group discussion - preliminary soil test report and crop requirement (pH level) 5) Demonstration - floriculture worker/instructor 6) Complete Performance Objective	1) Notes 2) Notes 3) Participation 4) Participation 5) Attendance 6) Performance Guide/ Instructor Approval	Selections from Master Resource List ILLINOIS 4005 'Nature of Soil Acidity and Major Plant Nutrients' (subject-matter unit) Co-operative Extension Service Office Floriculture Worker Performance Guide

1. Check out applicator and calibrate to make sure the desired quantity of lime will be distributed.

2. Put lime/dolomite in applicator and spread at the prescribed rate.

3. Disk or otherwise mix the lime/dolomite into the soil.

4. Flush applicator with water and coat interior with oil when job has been completed and prior to storing to prevent corrosion of the metal parts.

Floriculture Unit: SOIL AND MEDIA PREPARATION - FIELD SOILS

Competency Task: PASTEURIZE FIELD SOILS WITH CHEMICALS

Performance Objective	Learning Activities	Evaluation	Resources
Given chemical treatment, infected field, field tractor with vorlex pump or similar system, pasteurize the soil. For satisfactory performance, chemical will be applied following manufacturer's instructions, soil will test sterile following application, and application will meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-5 'Sterilizing Soil with Liquids and Chemicals' (module) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group discussion - manufacturer's instructions and safety precautions	3) Notes/ability to treat field properly and safely	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

1. Service tractor and the pasteurization equipment to be used.

2. Adjust all elements of the tractor and applicator to insure that it is properly synchronized and coordinated.

3. Review safety regulations for use and follow same carefully.

4. Connect gas cylinders to equipment and bring to the required pressure. The gas may be regulated at the required pressure by adjusting the by-pass line so that the gas is supplied in excess and the excess is returned to the intake side of the pump. Caution: The lines going to the cylinders must be tightened securely. If the system leaks, turn off cylinders and tighten. On some models it may be necessary to replace a gasket or coupling, but under no conditions should the equipment be operated if there is a leak in the system.

5. Operate tractor and pasteurization unit to make certain (1) that treatment chemical is fed into the soil evenly and uniformly and (2) that the plastic covering is secured with soil at its outer margins in order to prevent the escape of the fumigant. Caution: No leaks are to occur as a result of failure to adequately cover the edge of the plastic.

6. Thoroughly clean tank and all applicator equipment following use and store.

Media Mixes

- Shred Planting Media, *page 38*
- Screen Planting Media, *page 40*
- Mix Media Materials, *page 42*
- Pasteurize Media with Steam, *page 44*
- Pasteurize Media with Chemicals, *page 47*
- Take Soil Samples, *page 50*
- Determine pH Levels of Soil Samples, *page 52*
- Determine Soluble Salt Levels of Soil Samples, *page 54*
- Mix Fertilizers into Media, *page 56*
- Mark Off Planting Spaces, *page 58*

Media Mixes

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: SHRED PLANTING MEDIA

Performance Objective	Learning Activities	Evaluation	Resources
Given the required soil materials or medium to be shredded at approximately 10% field capacity, and the necessary tools and equipment, shred the planting medium. For satisfactory performance, planting medium must be shredded safely and thoroughy so no lumps or unshredded materials remain, and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List CALIFORNIA 'Growing Media for Ornamental Plants' (filmstrip) MICHIGAN 'Peats for Soil Improvement and Soil Mixes' (bulletin) NEW YORK 01.0599-02 'Preparing and Maintaining Ornamental Horticultural Soils' (module) WEST VIRGINIA 02 'Soil Preparation' (module) Manufacturer's Information Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - shredder operation and safety	4) Notes/ability to operate shredder safely	
	5) Group discussion - materials that can be shredded and used as planting media, soil moisture terms, i.e. 'field capacity'	5) Participation	
	6) Demonstration - floriculture worker/instructor	6) Attendance	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

Performance Guide SHRED PLANTING MEDIA

1. Bring materials to proper moisture levels, approximating 10 percent of "field capacity".
2. Perform service check on shredder before operating, review operator manual for safety use of equipment.
3. Place shredder on swept concrete floor to facilitate collection of shredded materials.
4. Shovel medium into shredder, controlling the rate to conform to the horsepower and capacity of the machine.
5. Collect medium from the shedder and place in bin.
6. Dispose of plastic bags or other packaging materials.
7. Clean shredder by washing with hose and wiping dry. Return to storage.

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: SCREEN PLANTING MEDIA

Performance Objective	Learning Activities	Evaluation	Resources
Given a soil medium, a shovel and a screen with openings sufficiently small to screen out lumps of soil, rocks or other debris, screen the medium. For satisfactory performance, medium must be free of all large chunks of soil, trash, sticks, grass, leaves or other forms of debris and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	ILLINOIS 4030 'Soil Texture' (subject-matter unit)
	3) Group discussion - screen meshes, reasons for screening media, soil aeration	3) Participation	NEW YORK 01.0599-02 'Preparing and Maintaining Ornamental Horticultural Soils' (module)
	4) Demonstration - floriculture worker/instructor	4) Attendance	Floriculture Worker
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	Performance Guide

Performance Guide

SCREEN PLANTING MEDIA

1. Identify the media to be screened.
2. Place screen over a wheelbarrow, box or other receptical.
3. Using shovel, place successive shovelfuls of planting medium on screen, breaking the lumps up with the hands, if necessary.
4. Rescreen, if necessary.
5. Shake the screen to pulverize medium and to remove trash and all debris.

5. Shake the screen to pulverize medium and to remove trash and all debris.

6. Dispose of debris in container.
7. Clean and store equipment.

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: MIX MEDIA MATERIALS

Performance Objective	Learning Activities	Evaluation	Resources
Given the required mixing ratios, materials, and a mechanical mixer, mix materials according to volume ratios specified. For satisfactory performance, ratios must be accurate and mixing must meeting instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List CALIFORNIA 1-204-134 'Grow Media for Ornamental Plants' (slidefilm) MICHIGAN 'Peats for Soil Improvement and Soil Mixes' (bulletin) WEST VIRGINIA 02 'Soil Preparation' (module) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group discussion - mixer operation and safety, various soil/soilless media mixes, media mixes for specific plants	3) Participation/ability to operation mixer safely	
	4) Group/Independent Project - figuring ratios for mixing media	4) Correct mathematical answers	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

1. Measure out the specified ratios of ingredients.

2. Put ingredients into a mixing box, if mixing is to be done by hand, or a mechanical mixer.

3. Mix uniformly with a clean shovel or garden hoe.

4. If operating a mechanical mixer the length of time required for mixing will vary according to type of mixer and other factors, but mixing should continue until no color or textural differences can be observed in the mixed medium.

5. Store the mixed medium into a suitable container.

6. Clean equipment and return to storage

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: PASTEURIZE MEDIA WITH STEAM

Performance Objective	Learning Activities	Evaluation	Resources
Given a medium to be pasteurized, steam application thermal probe, a bench or pasteurizing bin and the necessary tools, pasteurize the medium. For satisfactory performance, all items on the instructor checklist must be rated 'acceptable'.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List **KENTUCKY**
	2) Read subject-matter units	2) Notes	GG-6 'Sterilizing Soil' (module)
	3) Group discussion - steam applicator operation and safety, temperature ranges and their affect on pest irradication, soil toxicities	3) Participation/ability to operate steam applicator safely	**NEW YORK** 01.0599-02 'Preparing and Maintaining Ornamental Horticultural Soils' (module)
	4) Demonstration - floriculture worker/instructor	4) Attendance	**WEST VIRGINIA** 02 'Soil Preparation' (module)
	5) Complete Performance Objective	5) Performance Guide/ Instructor Checklist	Manufacturer's Instructions Floriculture Worker Performance Guide Instructor Checklist

PASTEURIZE MEDIA WITH STEAM

1. Make sure all tools are clean and sterile.

2. Check steam applicator to make certain it is in place and working properly.

3. Cover medium and seal with given cover.

4. Turn on steam at low pressure, take readings with thermal probe to assure that 180°F temperature is consistant throughout medium.

5. When temperature of medium is consistently 180°F, hold for a minimum of 30 minutes.

6. Allow medium to cool and stand until workable.

7. Cover medium to avoid contamination.

8. Clean all tools and equipment and store.

Instructor Checklist PASTEURIZE MEDIA WITH STEAM

ACCEPTABLE

1. Procedures for steam pasteurization were reviewed.
2. Tools and equipment were sterilized.
3. Steam applicator and medium were placed in bin and sealed by means of a vinyl cover.
4. Medium was brought to 180 F as determined by a thermal probe and held there for 30 minutes before allowing to cool.
5. Pasteurized medium was stored in a sterile area.
6. All equipment was cleaned and returned to proper storage area.

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: PASTEURIZE MEDIA WITH CHEMICALS

Performance Objective	Learning Activities	Evaluation	Resources
Given a bench containing the medium to be pasteurized, required chemicals, water, vinyl covering and protective clothing, pasteurize the medium. For satisfactory performance, all items in the instructor checklist must be rated 'acceptable'.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 1108-1.1 'Understanding and Safe Use of Pesticides' (slidefilm/slideset) KENTUCKY NP-4 'Treating Soil with Soil Fumigants' (module) NP-5 'Sterilizing Soil with Liquids and Chemicals' (module) WEST VIRGINIA 02 'Soil Preparation' (module) Agricultural Chemical Catalogues Floriculture Worker Performance Guide Instructor Checklist
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - various liquid/chemical treatments, safety precautions in handling chemicals	4) Participation/ability to handle chemicals safely	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Checklist	

1. Review manufacturer's instructions for safe and effective use of the treatment chemical.
2. Wear appropriate protective clothing.
3. Moisten medium to approximately 25 percent of field capacity.
4. Roll vinyl cover over the top of the bench, leaving ends open to insert the treatment chemical. Secure vinyl cover.
5. Activate the treatment chemical and insert under vinyl cover.
6. Allow cover to remain on medium for the time specified by the chemical manufacturer.
7. Ventilate area after chemical treatment, if necessary.
8. Clean all equipment according to manufacturer's directions.

Instructor Checklist PASTEURIZE MEDIA WITH CHEMICALS

ACCEPTABLE

1. Procedures for chemical pasteruization were reviewed.
2. Tools and equipment were sterilized.
3. Appropriate protective clothing was worn and all safety precautions were followed.
4. Chemical treatment was inserted into bench and vinyl cover secured.
5. Treatment and vinyl cover were allowed to remain on medium for specified period of time.
6. Area was well ventilated after treatment of soil.
7. Pasteurized medium was stored in a sterile area.
8. All equipment was cleaned and returned to proper storage area.

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: TAKE SOIL SAMPLES

Performance Objective	Learning Activities	Evaluation	Resources
Given a planting bed or other field areas, a spade, soil auger, and paper bags/containers, take soil samples. For satisfactory performance, two composite samples must be taken, representative of the area, taken from not less than 5 different holes, from a grid covering only one soil type and sampling must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 4001 'Collecting and Preparing Soil Samples for Testing' (subject-matter unit) CALIFORNIA 'How to Collect and Test Soil Samples' (KENTUCKY GG-1 'Taking Soil Samples' (modules) MICHIGAN 'Sampling Soils' (bulletin) OHIO 'Soil and It's Properties' (slideset) Coopertive Extension Service Office Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group/Independent Research - soil sampling techniques recommended by Cooperative Extension Service Office	4) Notes/report findings	
	5) Group discussion - composite soil samples	5) Participation	
	6) Demonstration - floriculture worker/instructor	6) Attendance	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

1. Identify the general area as well as the spot locations on a sketch map or grid from which the composite sample is to be collected.
2. Collect soil to a depth of 6 inches from 5 or more locations as identified on the grid.
3. Mix the soil taken from all locations together, combining it into a single 1 pint sample.
4. Label the sample with care for laboratory testing, making sure that the area from which it came is identified.
5. Clean all tools and equipment used and store.

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: DETERMINE pH LEVELS OF SOIL SAMPLES

Performance Objective	Learning Activities	Evaluation	Resources
Given two soil samples, an electric pH meter or reagent soil test kit, and a manual of instructions, determine the soil pH for each of the two samples. For satisfactory performance, readings on the two samples tested must agree within ± 0.1 pH unit on the meter, or match the reagent color charts. pH test results must also meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 4002 'pH Test for Soil Acidity' (subject-matter unit) 4005 'Nature of Soil Acidity and Major Plant Nutrients' (subject-matter unit) OHIO 'Soil and It's Properties' (slideset) WEST VIRGINIA 02 'Soil Preparation' (module) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - various pH testing methods	4) Participation	
	5) Group discussion - soil pH importance and affect on plant growth	5) Participation	
	6) Demonstration - floriculture worker/instructor	6) Attendance	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

1. Air dry soil sample.

2. Review manual of instructions to determine the precise procedures to be followed in preparing samples.

3. Prepare samples for electrode testing, according to instructions for preparing a soil solution.
   a. Check electrodes to see they are clean and operating properly.
   b. Measure out 25 milliliters of sample (beaker measure is satisfactory)
   c. Add 50 milliliters of distilled water.
   d. Stir the mixture and let stand for 30 minutes, stirring occasionally.
   e. Stir vigorously, just prior to reading.
   f. Insert electrodes into prepared sample. Caution: Electrodes must be placed in the solution just above the soil, but must not come to rest in the soil.
   g. Clean electrodes and store properly.

4. Prepare samples for reagent testing according to manufacturer's instructions.
   a. Mix required amounts of soil sample and reagent(s) according to instructions.
   b. Use color charts to determine pH level of soil sample.
   c. Clean up and return test kit to proper storage area.

110

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: DETERMINE SOLUBLE SALT LEVELS OF SOIL SAMPLES

Performance Objective	Learning Activities	Evaluation	Resources
Given a soil sample, an instrument (Solu-Bridge or equivalent), and a chart for interpreting readings, determine the soluble salts in the sample. For satisfactory performance, readings must vary no more than ±5% from a prepared and pre-determined sodium standard solution and testing must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 'Soil Testing & Fertility' (transparencies and study guide) CALIFORNIA 'How to Collect & Test Soil Samples' NEW YORK 01.0599-02 'Preparing and Maintaining Ornamental Horticultural Soils' (module) OHIO 'Soil and It's Properties' (slideset) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Group discussion - soluble salts affect on plant growth, ways to control soluble salts build up	3) Participation	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

1. Place portion of well mixed soil sample in funnel that has been lined with filter paper.
2. Add distilled water until soil becomes saturated and begins to glisten.
3. Connect funnel to suction flask.
4. Draw off solution extract.
5. Place electrodes from solo-bridge in extract.
6. Take reading.
7. Use chart to determine the percentage of soluble salts present in sample.
8. Clean Solu-Bridge and store in accordance with manufacturer's specifications.

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: MIX FERTILIZERS INTO MEDIA

Performance Objective	Learning Activities	Evaluation	Resources
Given a medium, granular fertilizer, shovel or hoe, and a wheelbarrow or other appropriate container, mix granular fertilizer into medium. For satisfactory performance, fertilizer will be thoroughly mixed into the medium and will meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	CALIFORNIA
	3) Read subject-matter units	3) Notes	'How to Fertilize Greenhouse Plants'
	4) Group discussion - different types of granular fertilizers, fertilizer analyses, percentages and ratios	4) Participation	1-204-136 'Fertilizing Ornamental Plants' (filmstrip) KENTUCKY
	5) Demonstration - floriculture worker/instructor	5) Attendance	GG-9 'Applying Fertilizer" (module) Manufacturer's Instructions
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	Floriculture Worker Performance Guide

MIX FERTILIZERS INTO MEDIA

1. Measure out fertilizer and medium according to the ratios which are to be used.

2. Put medium into a large box, wheelbarrow or other suitable receptacle.

3. Spread fertilizer on top of the medium.

4. Using a garden hoe or shovel, begin at the outer edge and gradually mix the ferilizer into the medium.

5. Clean equipment following use and store.

Floriculture Unit: SOIL AND MEDIA PREPARATION - MEDIA MIXES

Competency Task: MARK OFF PLANTING SPACES

Performance Objective	Learning Activities	Evaluation	Resources
Given a carnation bed to be planted, the required bedwire or fibered plastic, posts, stakes, a mallet or post driver and suitable string or wire (if necessary), mark off planting spaces. For satisfactory performance, bedwire or fibered plastic must be stretched and secured to posts/stakes at the desired height and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List CALIFORNIA 'How to Plant Seedlings' NEW YORK 01. 0503-01 'Introduction to Growing Greenhouse Crops' (module) Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

Performance Guide

MARK OFF PLANTING SPACES

1. Set posts at corners of the bed.
2. Roll out bedwire or fibered plastic to be used.
3. Stretch bedwire/plastic over bed and tie firmly to posts with string or wire on both ends of the bed.
4. Set stakes firmly and at uniform height along both sides of the planting bed
5. Affix wire/plastic to support stakes on both sides of the bed at ground level.
6. Return any extra stakes, wire/plastic or other unused items to storage.

Planting and Propagating Plants

- Label Plants or Cuttings, *page 60*
- Plant Seeds, *page 62*
- Transplant Seedlings, *page 65*
- Plant Bulbs in Beds, *page 67*
- Force Bulbs in Pots, *page 69*
- Take Cuttings, *page 72*
- Stick Cuttings, *page 75*
- Set Time Clocks for Automatic Mist System, *page 78*
- Remove Rooted Cuttings, *page 80*
- Transplant Cuttings, *page 83*
- Package Cuttings for Shipment, *page 85*
- Regulate Temperature of Cold Storage Unit, *page 87*

Planting and Propagating Plants

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: LABEL PLANTS OR CUTTINGS

Performance Objective	Learning Activities	Evaluation	Resources
Given cuttings or plants in flats and the required labels, label the cuttings or plants. For satisfactory performance, writing on all labels must be clear and legible and arranged so plants are in back of and to the right of the labels. The following information must be on each label: name of plant variety date student name All flats/containers must be labeled and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-15 'Labeling Planted Specimens' (module) PENNSYLVANIA 'Greenhouse Crop Production' (manual) Seed Packages Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group/Independent Project - practice writing labels using information on seed packages	3) Notes/correct labels	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

123

122

LABEL PLANTS OR CUTTINGS

1. Print labels legibly, with waterproof marker, or pencil, indicating the relevent information for a particular species, i.e. species/variety name, date, student name.
2. Follow a systematic procedure, inserting each label so that the plants it represents are in back of and to its right.
3. Double check all labels to assure correct placement

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: PLANT SEEDS

Performance Objective	Learning Activities	Evaluation	Resources
Given a particular kind of flower seeds, flats/ containers and growing medium, plant seeds. For satisfactory performance, seeds must be spaced and covered with media following the requirements of the particular seed and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	ILLINOIS 5010a 'Growing Flowering Annuals' (subject-matter unit)
	3) Read subject-matter units	3) Notes	
	4) Review seed catalogues/ seed packages for planting instructions	4) Notes	CALIFORNIA 1-240-231 'Bedding Plant Production' (filmstrip)
	5) Group discussion - broadcasting vs. row seeding	5) Participation	'Propagating Ornamental Plants' (filmstrip)
	6) Group/Independent Project - compare germination of same seed in different media	6) Notes/report findings	KENTUCKY NP-7 'Planting Seed' (module)
	7) Group/Independent Project - compare germination of seeds in different environmental conditions	7) Notes/report findings	NEW YORK 01.0505-03 'Plant Propagation from Seed' (module)
	8) Demonstration - floriculture worker/instructor	8) Attendance	PENNSYLVANIA 'Greenhouse Crop Production' (manual)
	9) Complete Performance Objective	9) Performance Guide/ Instructor Approval	

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: PLANT SEEDS - 2

Performance Objective	Learning Activities	Evaluation	Resources
			WEST VIRGINIA 03 'Seeds' (manual) WISCONSIN 100 'Success with Bedding Plants' (bulletin) Seed Company Catalogues Seed Package Instructions Floriculture Worker Performance Guide

1. Identify the seeds to be planted.
2. Fill the flats/containers with germination medium.
3. Make rows and plant seeds in rows, or broadcast seeds evenly over flats/containers.
4. Spread media over seeds to cover them. Caution: Follow specific depth recommendations for planting seeds.
5. Label all containers or flats with planting date, species, variety name, and student name.
6. Place flats in an area where proper environmental conditions are available for seed germination. Caution: A moist, well lighted area of suitable temperature is generally best for germination, but some species have special requirements.
7. Keep medium in flats moist until seeds have germinated. Caution: Mist system is preferable to hand watering.
8. Return unused materials to proper storage.
9. Clean the work area after use.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: TRANSPLANT SEEDLINGS

Performance Objective	Learning Activities	Evaluation	Resources
Given seedlings which have developed their first true leaves, dibble, the desired spacing intervals, growing medium, and appropriate sterile containers, transplant seedlings. For satisfactory performance, seedlings must be handled by the leaves and transplanted in the sterile containers with a survival rate of at least 90 percent after one week, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	CALIFORNIA
	3) Read subject-matter units	3) Notes	'How to Transplant Seedlings into Flats'
	4) Group discussion - reason for handling seedlings by leaves, not stem, use of dibble, depth of transplanting seedlings	4) Participation	'How to Transplant Seedlings from Flats into Pots' KENTUCKY
	5) Demonstration - floriculture worker/instructor	5) Attendance	NP-8 'Transplanting Seedlings to Pots' (module)
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	WEST VIRGINIA 06 'Transplanting' (module) Floriculture Worker Performance Guide

TRANSPLANT SEEDLINGS

1. Identify the seedlings to be transplanted.

2. Fill the sterile containers with medium.

3. Using a dibble, make holes in the medium into which the seedlings are to be transplanted.

4. Transplant the seedlings using label to help remove seedlings from flat, and between the roots and stems with the planting medium,

   Caution: a. Handle seedlings by their leaves - never by the stem.
   b. Seedlings should not be transplanted at too great a depth, they should be placed at the same depth they were initially growing.

5. Water transplants immediately.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: PLANT BULBS IN BEDS

Performance Objective	Learning Activities	Evaluation	Resources
Given a previously prepared field area, treated spring flowering bulbs, stakes, string, tools, and equipment, plant the bulbs. For satisfactory performance, bulbs will be planted in straight lines at the space interval and depth recommended for the particular bulb variety, bulbs will be labeled, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-6 'Planting Bulbs' (module) Bulb Catalogues Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Review bulb catalogues for spacing and planting depths	3) Notes/report findings	
	4) Group discussion - spring/summer flowering bulbs, easter lilies	4) Participation	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

Performance Guide

PLANT BULBS IN BEDS

1. Identify beds areas selected for planting.
2. Use string and stakes to mark off spacing for rows.
3. Using a hoe or bulb planter, cut furrow or make hole for planting the bulbs.
4. Place bulbs upright in furrow at spacing intervals and depth specified by the bulb grower.
5. Cover the bulbs with soil and tamp lightly to firm the seedbed.
6. Clean tools and return them to storage.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: FORCE BULBS IN POTS

Performance Objective

Given the necessary equipment and 100 of one or more types of spring flowering bulbs which are to be forced to meet a prescribed time schedule, control temperature, moisture, and light to force bulbs and meet the required schedule. For satisfactory performance, at least 95 percent of the bulbs must produce flowers on schedule and meet instructor approval.

Learning Activities	Evaluation
1) Read appropriate selections from Master Resource List	1) Notes
2) Read subject-matter units	2) Notes
3) Group discussion - bulbs, corms, tuberous structures, time schedules for forcing bulbs, cold treatments, precooled bulbs, moisture, light levels	3) Participation
4) Review bulb catalogues for varieties, cultural/environmental practices	4) Notes/report findings
5) Group/Independent Research - local industry practices	5) Notes/report findings
6) Demonstration - floriculture worker/instructor	6) Attendance
7) Complete Performance Objective	7) Performance Guide/ Instructor Approval

Resources

Selections from Master Resource List

ILLINOIS

5006 'Producing Plants by Asexual Propagation' (subject-matter unit)

CALIFORNIA

1-210-820 'Growing Container Plants' (manual)

KENTUCKY

NP-6 'Planting Bulbs' (module)

NP-29 'Forcing Potted Plants to Bloom as Seasonal Times' (module)

MICHIGAN

'Holland Bulb Forcers' Guide' (manual)

WEST VIRGINIA

08 'Greenhouse Control' (module)

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: FORCE BULBS IN POTS - 2

Performance Objective	Learning Activities	Evaluation	Resources
			Floriculture Worker Performance Guide

138

139

1. Drench the bulbs with fungicide.

2. Plant bulbs in desired medium, in a finishing container.

3. Place planted containers in cold storage, at 40°F for a period of time calculated according to time charts for forcing bulbs.

4. Remove container to growing area at appropriate time for that particular variety.

5. Maintain moisture and light levels as near the desired level as possible.

6. Clean area and return all equipment to proper storage areas.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: TAKE CUTTINGS

Performance Objective

Given pruners, knife, container, and plants from which cuttings are to be taken, take cuttings. For satisfactory performance, type of cutting to be taken will be identified, cuttings will be 3-5 inches in length, depending on the kind of plant, taken just below a node, free from disease, broken stems, and other damage, and meet instructor approval.

Learning Activities	Evaluation
1) Read appropriate selections from Master Resource List	1) Notes
2) View filmstrips/slides	2) Notes
3) Read subject-matter units	3) Notes
4) Group discussion - types of cuttings, importance of disease free stock, time of day to take cuttings, handling of cuttings	4) Participation
5) Group/Independent Project - compare differences in rooting time with different ornamental cuttings	5) Notes/report findings
6) Group/Independent Project - take stem cuttings, leaf cuttings, leaf-bud cuttings, etc.	6) Notes/report findings
7) Group/Independent Project - take cuttings from plants that do not propagate by cuttings	7) Notes/report findings
8) Demonstration - floriculture worker/instructor	8) Attendance

Resources

Selections from Master Resource List

ILLINOIS

5006 'Producing Plants by Asexual Propagation' (subject-matter unit)

CALIFORNIA

1-204-133 'Propagating Ornamental Plants' (filmstrip)

KENTUCKY

NP-10 'Take Cuttings' (module)

MICHIGAN

'Asexual Propagation of Plants' (slideset)

NEW YORK

01.0505-02 'Asexual Plant Propagation' (module)

TEXAS

'Propagating Horticulture Plants' (manual)

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: TAKE CUTTINGS - 2

Performance Objective	Learning Activities	Evaluation	Resources
	9) Complete Performance Objective	9) Performance Guide/ Instructor Approval	WEST VIRGINIA 04 'Rooting and Propagation' (module) Floriculture worker Performance Guide

Performance Guide TAKE CUTTINGS

1. Select plants for cuttings, which exhibit healthy, vigorous growth.

2. Use clean, sharp pruners or knife, to collect cuttings, and place in suitable containers.
   Caution: a. Take cutting ¼" below a node.
   b. make cut on a 45° angle.
   c. Be very careful not to damage the cuttings. Also, cuttings should be dampened, placed in cooler, depending on species, and then shipped or "stuck" as soon as possible.

3. Clean and return all equipment to storage.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: STICK CUTTINGS

Performance Objective

Given 100 fresh tip cuttings, fungicidal dip, rooting hormone, and prepared rooting beds or pots containing a rooting medium, stick the cuttings into the medium. For satisfactory performance, cuttings will be treated with fungicide, and hormone, inserted into the medium at a depth of 1-2 inches, spaced correctly for the type of plant cutting used, and meet instructor approval.

Learning Activities	Evaluation
1) Read appropriate selections from Master Resource List	1) Notes
2) View filmstrips/slides	2) Notes
3) Read subject-matter units	3) Notes
4) Group discussion - various rooting hormones, rooting medias, spacing of cuttings	4) Participation
5) Group/Independent Project - compare rooting medias with same type of cuttings	5) Notes/report findings
6) Group/Independent Project - use different strength rooting hormones on one type of cutting	6) Notes/report findings
7) Group/Independent Project - use a variety of cuttings	7) Notes/report findings
8) Demonstration - floriculture worker/instructor	8) Attendance
9) Complete Performance Objective	9) Performance Guide/ Instructor Approval

Resources

Selections from Master Resource List

ILLINOIS

5006 'Producing Plants by Asexual Propagation' (subject-matter unit)

CALIFORNIA

1-204-133 'Propagating Ornamental Plants' (filmstrip)

KENTUCKY

NP-10 'Taking Cuttings' (module)

MICHIGAN

'Asexual Propagation of Plants' (slideset)

NEW YORK

01.0505-02 'Asexual Plant Propagation' (module)

TEXAS

'Propagating Horticulture Plants' (manual)

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: STICK CUTTINGS

Performance Objective	Learning Activities	Evaluation	Resources
			WEST VIRGINIA 04 'Rooting and Propagation' (module) Floriculture Worker Performance Guide

Performance Guide

STICK CUTTINGS

1. Treat cuttings with a fungicidal dip and rooting hormone by immersing the cut end into the dip.
2. Spacing the cuttings according to type requirements, insert cuttings into medium at a depth of approximately 1 inch.
3. Firm up the medium around each cutting to insure good contact with the soil.
4. Place cuttings under mist in propagation bench.
5. Clean up the area and return all equipment and materials to proper place.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: SET TIME CLOCKS FOR AUTOMATIC MIST SYSTEM

Performance Objective	Learning Activities	Evaluation	Resources
Given a mist propagation system and five different time interval settings for the time clocks, set the clocks to activate the system in accordance with the prescribed times. For satisfactory performance, the system must function accurately with no more than 10 percent variation from the prescribed time intervals, and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Review manufacturer's instructions	2) Notes	Manufacturer's Instructions
	3) Group discussion - time clock settings, mist intervals,	3) Participation	Floriculture Worker
	4) Independent Project - assign different student each week to maintain tine clock settings	4) Instructor Approval	Performance Guide
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

Performance Guide SET TIME CLOCKS FOR AUTOMATIC MIST SYSTEM

1. Identify the five desired time settings.
2. Locate the time clocks.
3. Move the 'on' indicator on the 24 hours clock to the time desired for starting the misting cycles and the 'off' indicator to the time when the misting is to stop.
4. Set trippers on the short interval time clock to obtain the intervals desired misting schedule.
5. Check the system with a watch, making adjustments in the settings as required.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: REMOVE ROOTED CUTTINGS

Performance Objective	Learning Activities	Evaluation	Resources
Given a rooting bed or flat filled with rooted tip cuttings, remove 25 of the rooted cuttings by hand. For satisfactory performance, rooted cuttings must be removed without tearing or damaging roots or foliage, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 5006 'Producing Plants by Asexual Propagation' (subject-matter unit) CALIFORNIA 'Propagating Ornamental Plants' (filmstrip) KENTUCKY NP-10 'Take Cuttings' (module) MICHIGAN 'Asexual Propagation of Plants' (slideset) NEW YORK 01.0505-02 'Asexual Plant Propagation' (module) TEXAS 'Propagating Horticulture Plants' (manual)
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: REMOVE ROOTED CUTTINGS - 2

Performance Objective	Learning Activities	Evaluation	Resources
			WEST VIRGINIA 04 'Rooting and Propagation' (module) Floriculture Worker Performance Guide

157

156

1. Remove cuttings without damaging them by inserting the hand under the rooted cuttings and lifting them out of the bed or flat in which they have been rooted.

2. Place cuttings in container large enough to prevent damage to the plant and in which the cuttings can be kept moist.

3. Store cuttings at appropriate temperature.

4. Clean work area.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: TRANSPLANT CUTTINGS

Performance Objective	Learning Activities	Evaluation	Resources
Given cuttings which have rooted, dibble, growing medium, and appropriate sterile containers, transplant cuttings. For satisfactory performance, cuttings must be handled with care and transplanted in the sterile containers with a survival rate of at least 90 percent after one week, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List WEST VIRGINIA 06 'Transplanting' (module) Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group discussion - handling of cuttings, methods of transplanting, types of cuttings	3) Participation	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

Performance Guide

TRANSPLANT CUTTINGS

1. Identify the cuttings to be transplanted.

2. Fill the sterile containers with medium.

3. Using a dibble, make holes in the medium into which the cuttings are to be transplanted.

4. Transplant the cuttings using label to help remove cuttings from flat/bench,
   Caution: a. handle cuttings carefully, spreading roots outward in pot before filling.
   b. do not allow cuttings to dry out during transplanting process.

5. Water transplants immediately.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: PACKAGE CUTTINGS FOR SHIPMENT

Performance Objective	Learning Activities	Evaluation	Resources
Given cut flowers or foliage, plastic sleeves and waxed paper boxes or other containers, package the cuttings for shipment. For satisfactory performance, flower/foliage numbers in each bunch must not be short of the specified number, and must not exceed it more frequently than 15 percent of the time, and packaging must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	KENTUCKY NP-68 'Packaging and Loading Orders' (module)
	3) Group/Independent Research - local industry practices	3) Notes/report findings	Florist Association Recommendations
	4) Demonstration - floriculture worker/instructor	4) Attendance	Floriculture Worker Performance Guide
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

Performance Guide

PACKAGE CUTTINGS FOR SHIPMENT

1. Identify flowers/foliage materials to be packaged.

2. Verify the number of flowers/foliage per bunch and the total number per box.

3. Select uniform flower/foliage of good quality and role each bunch in waxed paper or place them in a plastic sleeve.

4. Place the bunches in a packing box.

5. Fill in excess space with newspaper or other suitable packing materials to prevent flowers/foliage from shifting about in packages.

6. Close the container and seal.

Floriculture Unit: PLANTING AND PROPAGATING PLANTS

Competency Task: REGULATE TEMPERATURE OF COLD STORAGE UNIT

Performance Objective	Learning Activities	Evaluation	Resources
Given a cold storage unit equipped with thermostatic controls and a specified temperature at which the unit is to be operated, set the thermostat to maintain the specified temperature. For satisfactory performance, the temperature in the unit when regulated must not vary more than ±2 F from the desired temperature and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-27 'Setting and Adjusting Thermostats' (module) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Review manufacturer's instructions	3) Notes	
	4) Independent Project - assign different student each week to maintain cooler	4) Instructor Approval	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

1. Operate the unit to make sure it is working.

2. Calibrate thermostat with the thermometer.
   a. Check the thermostat reading with the temperature reading on the thermometer.
   b. Adjust the thermostat, if necessary.

3. Set controls to temperature specified.

4. Using maximum - minimum thermometer, operate system and make necessary adjustments to insure desired temperature.

Cultural and Environmental Control Practices

- Pinch Flowering Plants, *page 89*
- Disbud Flowering Plants, *page 91*
- Prune Plants, *page 93*
- Apply Growth Regulating Chemicals, *page 95*
- Install Shade Cloth, *page 97*
- Apply Shading Compound to Greenhouse Glass, *page 100*
- Install Black Cloth to Regulate Photoperiod, *page 102*
- Install Supplemental Lighting to Regulate Photoperiod, *page 104*
- Set Time Clocks to Regulate Lighting, *page 106*
- Adjust Automatic Cooling System, *page 108*
- Cultivate Soil with a Rototiller, *page 111*
- Aerate Compacted Soils in Beds, *page 113*
- Stake and Tie Plants, *page 116*
- Raise Bedwire or Fibered Plastic, *page 118*
- Apply Granular Fertilizer, *page 120*
- Apply Liquid Fertilizer, *page 123*
- Remove Weeds Manually from Potted Plants, *page 126*
- Remove Weeds Manually from Floral Crops, *page 129*
- Remove Weeds with Tractor Drawn Mechanical Cultivators, *page 132*

Cultural and Environmental Control Practices

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: PINCH FLOWERING PLANTS

Performance Objective	Learning Activities	Evaluation	Resources
Given flowering plants in pots, beds or a field area and a pail or other receptacle, pinch the flowering plants. For satisfactory performance, for plants 4-6 inches in height, only about 4-6 leaves will be left on the pinched stem; on small plants only the very tip of the stem (about ½ inch) will be pinched, and will meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	ILLINOIS 5010a 'Growing Flowering Annuals' (subject-matter unit)
	3) Group discussion - plant growth, where to pinch plant, resulting growth habit of plants, schedule for pinching	3) Participation	NEW YORK 01.0503-02 'Growing Bedding Plants' (module)
	4) Demonstration - floriculture worker/instructor	4) Attendance	WISCONSIN 100 'Success with Bedding Plant' (bulletin)
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	Floriculture Worker Performance Guide

1. Identify the flowering plants to be pinched.
2. Grasp the stem tip and young immature leaves of each plant, snapping them from the plant by means of the thumb and forefinger.
3. Accumulate the severed tips and leaves in the container provided for that purpose and discard.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: DISBUD FLOWERING PLANTS

Performance Objective	Learning Activities	Evaluation	Resources
Given 6 or 8 flowering plants in the bud stage or a greater number growing in a bed, and the purpose or utility for which they are being grown, disbud the plants. For satisfactory performance, plants must be disbudded without any unnecessary damage, so their intended purpose will be achieved, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-28 'Forcing Potted Plants to Bloom at Seasonal Times' (module) NEW YORK 01.0503-03 'Growing Specialized Greenhouse Holiday Crops' (module) OHIO 'Cut Flowers' (slides and script) 'Flowering Potted Plants' (slides and script) WISCONSIN 511 'Flowering Potted Plants' (bulletin) Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - plant types, purpose for being grown, method of disbudding to attain a particular purpose	4) Participation	
	5) Group/Independent Research - local industry practices	5) Notes/report findings	
	6) Demonstration - floriculture worker/instructor	6) Attendance	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

Performance Guide

DISBUD FLOWERING PLANTS

1. Determine purpose for which the plant is being grown.

2. Roll buds off using thumb and forefinger working systematically from one end of the bed to the other.

3. Dispose of parts removed fromt the plants.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: PRUNE PLANTS

Performance Objective	Learning Activities	Evaluation	Resources
Given a pruning knife, shears, a bucket or pail and 3 potted plants each of which is to be pruned for a specified purpose, prune the plants. For satisfactory performance, each plants must be pruned to achieve the stated purpose(s) and pruning must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List CALIFORNIA 1-204-132 'Elements of Pruning' (filmstrip) KENTUCKY NP-66 'Removing Dead and Diseased Blooms and Plant Parts' (module) WISCONSIN 511 'Flowering Potted Plants' (bulletin) Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group discussion - reasons for pruning plants, methods of pruning	3) Participation	
	4) Group/Independent Research - local industry practices	4) Notes/report findings	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

Performance Guide

PRUNE PLANTS

1. Identify each plant and the purpose for which it is to be pruned. Use sharp prunes or knife.
    a. Prune the plant to restrict growth and induce branching by taking off the tips of all the stems.
    b. Prune the plant to improve shape by cutting or clipping off unbalanced, or unsymmetrical branckes and stems.
    c. Prune the plant to groom it for sale by pinching or cutting off all dead leaves or other plant parts and by cutting out spindly or weak shoots.
2. Collect and dispose all plant parts removed in the pruning process.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: APPLY GROWTH REGULATING CHEMICALS

Performance Objective	Learning Activities	Evaluation	Resources
Given a suitable sprayer, the required chemical solution and floral plants to be treated, apply growth regulating chemicals. For satisfactory performance, the chemical solution must be sprayed uniformly and evenly over the entire leaf area of the plant and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	ILLINOIS
	3) Read subject-matter units	3) Notes	5001 'Poinsettias - Care and Propagation- (subject-matter unit)
	4) Group discussion - types of growth regulating compounds and uses, application of growth regulating compounds	4) Participation	5013 'Producing Poinsettias Commercially' (subject-matter unit) 5014 'Growing Lilies' (subject-matter unit)
	5) Group discussion - EPA regulations for handling chemicals	5) Participation	CALIFORNIA 'How to Safely Use Sprays and Dusts on Plants'
	6) Demonstration - floriculture workers/instructor	6) Attendance	KENTUCKY
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	NP-31 'Controlling Growth Rate by Applying Retardants' (module) EPA Regulations Floriculture Worker Performance Guide

1. Review manufacturer's specifications, especially those having to do with safety and rate of application.

2. Make sure the sprayer is clean, functions properly and that you are familiar with its operation.

3. Fill sprayer with required spray solution.

4. Bring tank to required air pressure.

5. Spray plants, covering the entire leaf area.

6. Label plants so they can be identified.

7. Clean sprayer and other equipment, making sure that sprayer is thoroughly rinsed and that screens and nozzles are treated with diesel fuel to prevent corrosion.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: INSTALL SHADE CLOTH

Performance Objective	Learning Activities	Evaluation	Resources
Given a greenhouse area where shade cloth needs to be installed, the required shade cloth, the necessary tools, materials and equipment, install the shade cloth. For satisfactory performance, the shade cloth, must be firmly fastened to the fram of the superstructure, smooth and neat in appearance, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 680 'Greenhouses - Uses and Designs' (filmstrip) KENTUCKY NP-31 'Controlling Light Requirements by Shade Cloth' (module) OHIO 'Greenhouses and Related Structures' (slides and script) TEXAS 'Greenhouse Operation and Management' (manual) WEST VIRGINIA 08 'Greenhouse Control' (manual) Manufacturer's Instructions Floriculture Worker
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - uses of shade cloth, types of shade cloth, manual/automatic shade cloth systems	4) Participation	
	5) Review manufacturer's instructions	5) Notes	
	6) Field trip - local greenhouse to view shade cloth installation	6) Attendance	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: INSTALL SHADE CLOTH - 2

Performance Objective	Learning Activities	Evaluation	Resources
			Performance Guide

Performance Guide

INSTALL SHADE CLOTH

1. Identify the area to be covered and the purpose of installation.
2. Check support wires and framework of the superstructure over which shade cloth is to be installed to make sure they are adequate.
3. Determine the best method to use in the installation process - whether by pig rings, grommets, or other means.
4. Determine the specific measurements of the area.
5. Allowing for necessary overlap, cut the required length or lengths of shade cloth from roll or bolt to meet requirements.
6. Install shade cloth following the recommended procedures for the method determined to be most satisfactory.
7. Clean tools and equipment used, returning all items to their proper place when task has been completed.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: APPLY SHADING COMPOUND TO GREENHOUSE GLASS

Performance Objective	Learning Activities	Evaluation	Resources
Given the specified foot candle requirements, light meter, sprayer and a glass greenhouse, apply shading compound to the greenhouse. For satisfactory performance, **successive** coats of shading **compound** are to be applied uniformly to obtain the required foot candle reading ±10 percent on a clear day, and application must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List TEXAS 'Greenhouse Operation and Management' (manual) WEST VIRGINIA 08 'Greenhouse Control' (manual) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group discussion - types of shading compounds (lime, latex), schedules for application, removal of shading compound	3) Participation	
	4) Review manufacturer's instructions	4) Notes	
	5) Group/Independent Research - local industry practices	5) Notes/report findings	
	6) Demonstration - floriculture worker/instructor	6) Attendance	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

Performance Guide

APPLY SHADING COMPOUND TO GREENHOUSE GLASS

1. Check out spray equipment to make sure it operates properly.

2. Determine foot candle light requirements and apply compound as required to obtain the desired foot candle reading. Caution: Do not apply more compound than is needed; it is easier to spray on an additional coat than it is to remove the compound once it is applied.

3. Clean spray gun and other equipment used and return to storage.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: INSTALL BLACK CLOTH TO REGULATE PHOTOPERIOD

Performance Objective	Learning Activities	Evaluation	Resources
Given one or more benches or beds with growing plants, black cloth, support wires and all other essential equipment, regulate the photoperiod by installing and covering the plants with black cloth. For satisfactory performance, the black cloth, must eliminate all light during the regulated time period, it must be easily removed and replaced, and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-28 'Forcing Potted Plants to Bloom at Seasonal Times' (module) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group discussion - types and uses of black cloth, photoperiodism	3) Participation	
	4) Review manufacturer's instructions	4) Notes	
	5) Group/Independent Research - local industry practices	5) Notes/report findings	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

INSTALL BLACK CLOTH TO REGULATE PHOTOPERIOD

1. Determine what width of black cloth is required and select appropriate width. Caution: Cloth must be wide enough to cover the entire bench with enough overlap on sides and ends to exclude all light.

2. Check support wires to make certain thay they are satisfactory and that there are no sharp edges that might snag the cloth or interfere with the covering and uncovering of the plants.

3. Roll out the black cloth over the wires and plants.

4. Tighten cloth enough to prevent sagging and exclude light.

5. Use cloth pins, clips and weights if necessary to secure ends and corners of cloth.

6. Check that black cloth eliminates all light from the area.

7. Return tools and unused cloth or other materials to their proper place for storage.

8. Remove cloth after regulated time period, replacing the same as required.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: INSTALL SUPPLEMENTAL LIGHTING TO REGULATE PHOTOPERIOD

Performance Objective	Learning Activities	Evaluation	Resources
Given a greenhouse bench or field bed, a specified foot candle reading to be attained, light bulbs, insulated electrical wire, clamp-on sockets, supports for the wires, and a light meter capable of measuring very low light intensities (0-50 foot candles) place light bulbs at proper height and spacing to provide the minimum specified foot candle of light on all areas of bench or bed. For satisfactory performance, the specified light intensity must be verified by the use of a light meter and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	KENTUCKY NP-28 'Forcing Potted Plants to Bloom at Seasonal Times' (module)
	3) Group/Independent Research - local industry practices	3) Notes/report findings	
	4) Group discussion - photoperiodism, footcandle measurements	4) Participation	TEXAS 'Greenhouse Operation and Management' (manual)
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	Performance Guide

Performance Guide

INSTALL SUPPLEMENTAL LIGHTING TO REGULATE PHOTOPERIOD

1. Put up supports for the wire. These should be spaced on approximately 20 foot centers.
2. Put up wire. The wire should be fastened to the supports securely, with no sag between supports.
3. Clamp sockets on wire at trial spacing. The sockets may need to be rearranged to provide the desired amount of light.
4. Insert light bulbs in the sockets.
5. Measure foot candle at night or under black cloth at edges of bench or field using light meter.
6. Readjust spacing or wattage of bulbs if a minimum of 10 foot candles are not being received at all points in the field or on the bench.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: SET TIME CLOCKS TO REGULATE LIGHTING

Performance Objective	Learning Activities	Evaluation	Resources
Given a specified floral crop, functional time clocks and an adequate artificial lighting system, set time clocks. For satisfactory performance, time clocks must provide the required duration of light by ±5 percent, lights must come on within 5 minutes of the time specified, and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	TEXAS
	3) Review manufacturer's instructions	3) Notes	'Greenhouse Operation and Maintenance' (manual)
	4) Group discussion - critical day length, light levels	4) Participation	WEST VIRGINIA 08 'Greenhouse Control' (manual)
	5) Demonstration - floriculture worker/instructor	5) Attendance	Manufacturer's Instructions Floriculture Worker
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	Performance Guide

SET TIME CLOCKS TO REGULATE LIGHTING

1. Determine critical night period for crop.

2. Set time clock correctly to trigger the desired response.
   Note: The mechanics of setting the clock are covered in Irrigation practices - "Set time clocks for automatic Irrigation system"

3. Measure the light being received by the flower crop to make sure it is within 5 percent of the required level.

4. Check on and off times of the lights. Differences between the desired times and the actual cycling time should never exceed 5 minutes.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: ADJUST AUTOMATIC COOLING SYSTEM

Performance Objective	Learning Activities	Evaluation	Resources
Given a range of temperature to be maintained in a greenhouse and thermostate connected to the automatic cooling system, bring the greenhouse temperature to the desired reading. For satisfactory performance, the temperature must be brought within the prescribed range of temperature within 1-2 hours after adjustment, and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 680 'Greenhouses - Uses and Designs' (filmstrip) KENTUCKY NP-27 'Setting Adjusting Thermostats' (module) OHIO 'Greenhouses and Related Structures' (slides and script) TEXAS 'Greenhouse Operation and Management' (manual) WEST VIRGINIA 08 'Greenhouse Control' (manual) Manufacturer's Instructions Floriculture Worker
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - vents, fans, evaporative coolers, fan and pad systems, affect of temperature fluctuations on corps, suggested day/night/cloudy day greenhouse temperatures	4) Participation	
	5) Group/Independent Research - local industry practices	5) Notes/report findings	
	6) Field trip - local greenhouse to view temperature control measures used	6) Attendance	
	7) Demonstration - floriculture worker/instructor	7) Attendance	
	8) Complete Performance Objective	8) Performance Guide/ Instructor Approval	

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: ADJUST AUTOMATIC COOLING SYSTEM - 2

Performance Objective	Learning Activities	Evaluation	Resources
			Local Greenhouse
			Performance Guide

ADJUST AUTOMATIC COOLING SYSTEM

1. Calibrate thermostat with thermometers by adjusting thermostats to the correct temperature readings.

2. Operate vent openings prior to fan operation to make certain that they function properly.

3. Bring temperature to a reading within a specified acceptable range.

4. Maintain the temperature within the specified temperature range.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: CULTIVATE SOIL WITH A ROTOTILLER

Performance Objective	Learning Activities	Evaluation	Resources
Given a rototiller and a plot of land, rototill the soil an the assigned area preparatory to planting. For satisfactory performance, rototilled soils must be broken up, pulverized and left in a loose friable condition without large holes or depressed areas, and tilling must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List CALIFORNIA 'Growing Media for Ornamental Plants' (filmstrip) NEW YORK 01.0599-02 'Preparing and Maintaining Ornamental Horticulture Soils' (module) WEST VIRGINIA 02 'Soil Preparation' (manual) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Review manufacturer's instructions	4) Notes	
	5) Group discussion - soil texture, structure, its affect on plant growth	5) Participation	
	6) Demonstration - floriculture worker/instructor	6) Attendance	
	7) Complete Performance Guide	7) Performance Guide/ Instructor Approval	

Performance Guide

CULTIVATE SOILS WITH A ROTOTILLER

1. Identify plot of land to be rototilled.

2. Perform service check on rototiller.

3. Adjust depth setting on rototiller by adjusting the depth control mechanism. Till shallow first, then till deeper the second time.

4. Rototill the assigned area by:
   a. Starting on one side of the field or
   b. By starting in the middle and making consecutive overlapping passes until the entire field is finished. Either procedure is acceptable.
   c. Do not walk behind tiller on tilled ground.

5. Clean rototiller following use and store it in its proper place.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: AERATE COMPACTED SOILS IN BEDS

Performance Objective	Learning Activities	Evaluation	Resources
Given pine bark, peat moss, sand, perlite, vermiculite, the required equipment and soils that are too heavy and compacted for producing a good floriculture crop, aerate the soils. For satisfactory performance, the addition of perlite, vermiculite, peat moss or other organic matter must make the compacted soils more porous and friable, and the soils must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 4028 'Soil Structure' (subject-matter unit) 4029 'Soil Color' (subject-matter unit) 4030 'Soil Texture' (subject-matter unit) 4052 'Understanding Soils' (subject-matter unit) CALIFORNIA 'Growing Media for Ornamental Plants' (filmstrip) MICHIGAN E-516 'Peats for Soil Improvement and Soil Mixes' (bulletin) NEW YORK 01.0599-02 'Preparing and Maintaining Ornamental Horticulture Soils' (module)
	2) View filmstrips/slides	2) Notes	
	3) Group discussion - soil amendments, their uses, pH levels, soil/soiless mixes	3) Participation	
	4) Group/Independent Research - local industry practices	4) Notes/report findings	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: AERATE COMPACTED SOILS IN BEDS - 2

Performance Objective	Learning Activities	Evaluation	Resources
			OHIO 'Soil and Its Properties' (slides and script) WEST VIRGINIA 02 'Soil Preparation' (module) Floriculture Worker Performance Guide

1. Determine degree of aeration required. Caution: Aeration for floral crops requires the adding of different materials such as vermiculite, peat moss and other organic residues to the existing medium. Since there is no exact way to determining the quantities of the various materials, aeration is sometimes a 'trial and error' process. But feeling and squeezing the soil should give a good idea of the density and porosity of the soil, providing the best clues for 'aeration'.

2. Mix proportionate amounts of sand, perlite, vermiculite, peat moss, pine bark, cypress shavings, or other organic material. Amount to be mixed will vary with the degree of porosity desired.

3. Store equipment and left over materials following use.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: STAKE AND TIE PLANTS

Performance Objective	Learning Activities	Evaluation	Resources
Given suitable twine, string, or twist ties, the necessary stakes and flowering plants requiring support other than that provided by roots, stake and tie the plants. For satisfactory performance, support stakes must be placed in such a way that they will not damage existing roots or impair root development, string must not be tied so tightly that it will cut or damage the stems and branches, and staking and tying must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List Floriculture Worker Performance Guide
	2) Group discussion - correct methods of staking plants, reasons for staking	2) Participation	
	3) Demonstration - floriculture worker/instructor	3) Attendance	
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	

212

213

1. Identify the particular plants needing to be staked and tied.

2. Place stakes in such a way that they will not damage plant roots and at sufficient depth to sustain the plants.

3. Tie plants to stakes firmly to hold them in an upright position, but not so tightly that stems will be damaged or growth impeded. Larger plants should be tied both at or near the top and also near the bottom.

4. Return tools and extra materials to storage when the job is completed.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: RAISE BEDWIRE OR FIBERED PLASTIC

Performance Objective	Learning Activities	Evaluation	Resources
Given a pair of pliers, tie wire, a knife, a flower crop growing in a greenhouse, and bedwire of fibered plastic in place and a specified height to which it is to be raised, elevate the bedwire or add another layer of fibered plastic to the new height. For satisfactory performance, the bedwire/fibered plastic must be raised to the prescribed level ±½ inch, well secured, with few or no plants injured in the process, and meeting instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	NEW YORK 01.0503-01 'Introduction to Growing Greenhouse Crops' (module)
	3) Read subject-matter units	3) Notes	
	4) Review manufacturer's instructions	4) Notes	OHIO
	5) Demonstration - floriculture worker/instructor	5) Attendance	'Cut Flowers' (slides and script)
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	Manufacturer's Instructions Floriculture Worker Performance Guide

Performance Guide

RAISE BEDWIRE OR FIBERED PLASTIC

1. Loosen ties or hanger brackets where bedwire is secured to the posts or steel support stakes at the ends of the bed.
2. Loosen, raise and reattach one side of the bedwire at the desired height.
3. Loosen, raise and reattach the other side of the bedwire so that it will be level with the opposite side.
4. Raise and reattach the ends of the bedwire to correspond with the sides.
5. Return pliers and unused materials to their appropriate places.

1. Determine length of fibered plastic needed to cover bed area. Cut plastic from roll in desired length.
2. Attach fibered plastic to posts or steel support stakes at the ends of the bed. Make sure plastic is at the proper height.
3. Return pliers, knife and materials to their appropriate places.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: APPLY GRANULAR FERTILIZER

Performance Objective	Learning Activities	Evaluation	Resources
Given granular fertilizer, a specified application rate, a plot of land where a floral crop is to be planted, and a broadcast fertilizer spreader with which the fertilizer is to be applied, calibrate the spreader to deliver the specified amount of fertilizer and apply the same. For satisfactory performance, there must be no spills, the fertilizer must be applied uniformly at the specified rate, and application must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 4010a 'Planning a Fertilizer Program' (subject-matter unit) CALIFORNIA 'How to Fertilize Greenhouse Plants' KENTUCKY GG-9 'Applying Fertilizer' (module) GG-10 'Cleaning and Lubricating Fertilizer Applicators' (module) FD-6 'Fertilizing Plants' (module) MICHIGAN E-486 'Secondary & Micronutrients' (bulletin)
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Review manufacturer's instructions - fertilizer and spreader	4) Notes	
	5) Group discussion - forms of fertilizers, methods of application-broadcasting, sidedressing, banding	5) Participation	
	6) Demonstration - floriculture worker/instructor	6) Attendance	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: APPLY GRANULAR FERTILIZER - 2

Performance Objective	Learning Activities	Evaluation	Resources
			NEW YORK 01.0599-01 'Controlling Insects, Diseases, & Fertilization' (module) WEST VIRGINIA 07 'Fertilizer' (module) Manufacturer's Instructions Floriculture Worker Performance Guide

1. Check fertilizer spreader to determine that is is functional.

2. Mark off 500 square feet of land area for testing and calibrating the spreader.

3. Set feed controls on spreader to apply the desired amount of fertilizer.

4. Adjust setting up or down as necessary to give the desired rate.

5. Calculate new rate and adjust setting further if necessary.

6. Using a systematic procedure, pull the spreader with tractor and apply the fertilizer. spreading apply ½ of the fertilizer in one direction and the remaining ½ at right angles to the first spreading directions

7. Wash out spreader with water to remove dust or granules that have a corrosive effect on the spreader and cause rust.

8. Treat moving parts of spreader with oil and store when the job is finished.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: APPLY LIQUID FERTILIZER

Performance Objective	Learning Activities	Evaluation	Resources
Given a floral crop to be fertilized, an irrigation system, liquid fertilizer, the desired ratios of fertilizer liquid to water, and an injection system, apply the liquid fertilizer to the floral crop. For satisfactory performance, the liquid fertilizer must be applied in the specified amounts, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	ILLINOIS 4010a 'Planning a Fertilizer Program' (subject-matter unit)
	3) Read subject-matter units	3) Notes	
	4) Review manufacturer's instructions - fertilizer and injection system	4) Notes	CALIFORNIA 'How to Fertilize Greenhouse Plants'
	5) Group discussion - soluble forms of fertilizers, methods of application, various injector systems	5) Participation	KENTUCKY GG-9 'Applying Fertilizer' (module)
	6) Demonstration - floriculture worker/instructor	6) Attendance	GG-10 'Cleaning and Lubricating Fertilizer Applicators' (module)
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	FD-6 'Fertilizing Plants' (module)
			MICHIGAN E-486 'Secondary & Micronutrients' (bulletin)

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: APPLY LIQUID FERTILIZER - 2

Performance Objective	Learning Activities	Evaluation	Resources
			NEW YORK 01.0599-01 'Controlling Insects, Diseases, & Fertilization' (module) WEST VIRGINIA 07 'Fertilizer' (module) Manufacturer's Instructions Floriculture Worker Performance Guide

1. Determine the amount of irrigation water to be applied for unit area of crop.

2. Determine the amount of liquid fertilizer required to give the desired ratio.

3. Inject liquid fertilizer into irrigation system in accordance with requirements.

4. Time the irrigation to apply the required amounts of fertilizer.

5. Flush the system following use to prevent corrosion and deterioration of the system.
   Caution: If detergent is used in flushing select a detergent that will not harm the crop.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: REMOVE WEEDS MANUALLY FROM POTTED PLANTS

Performance Objective	Learning Activities	Evaluation	Resources
Given one or more benches in the greenhouse filled with potted flower or foliage plants of variable size and species, manually remove all weeds growing in the potted plants. For satisfactory performance, 98 percent of the visible weeds must be removed within the period of time specified by the instructor, none of the plants are to be damaged, collected weeds must be disposed of, and removal must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 791 'Weed Identification' (slidefilm/slideset) 791a 'Practice Set Weed Identification' (slidefilm/slideset) 800 'Identification of Weed Seedlings, Pt. 1' (slidefilm/slideset) 801 'Identification of Weed Seedlings, Pt. 2' (slidefilm/slideset) 803 'Identification of Weed Seedlings, Pt. 3' (slidefilm/slideset) 811 'The Wicked World of Weeds' (slidefilm/slideset) OHIO 'Weed Control - Cultural and Chemical' (manual)
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - reasons to remove weeds from plants (competition), common weeds	4) Participation	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: REMOVE WEEDS MANUALLY FROM POTTED PLANTS - 2

Performance Objective	Learning Activities	Evaluation	Resources
			Floriculture Worker Performance Guide

1. Identify flowering/ foliage plants in pots from which weeds are to be removed.

2. Remove weeds with fingers. Caution: Care must be taken to pull up the weed rather than breaking them off above the ground; otherwise the weeds may grow again.

3. Dispose collected weeds in refuse containers task in completed.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: REMOVE WEEDS MANUALLY FROM FLORAL CROPS

Performance Objective	Learning Activities	Evaluation	Resources
Given a field area or bed of flowering plants to be weeded, a hoe or other suitable implement for removing weeds, manually remove the weeds. For satisfactory performance, floral plants should show little or no damage from the weeding process, 95 percent or more of all visible weeds must be cut off below ground level and removed, weeds must be disposed of as indicated by instructor, and weeding must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 791 'Weed Identification' (slidefilm/slideset) 791a (supp) 'Practice Set Weed Identification' (slidefilm/slideset) 800 'Identification of Weed Seedlings, Pt. 1' (slidefilm/slideset) 801 'Identification of Weed Seedlings, Pt. 2' (slidefilm/slideset) 803 'Identification of Weed Seedlings, Pt. 3' (slidefilm/slideset) 811 'The Wicked World of Weeds' (slidefilm/slideset) OHIO 'Weed Control - Cultural and Chemical' (manual)
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - reasons to remove weeds from plants (competition), common weeds	4) Participation	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: REMOVE WEEDS MANUALLY FROM FLORAL CROPS - 2

Performance Objective	Learning Activities	Evaluation	Resources
			Floriculture Worker Performance Guide

Performance Guide REMOVE WEEDS MANUALLY FROM FLORAL CROPS

1. Identify beds or other area to be weeded.
2. Remove weeds by hoeing shallowly around plants, checking carefully for weeds that might be hidden by the foliage of the floral crop.
3. Dispose of weeds that have been removed.
4. Clean and store hoe or other tools following use.

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: REMOVE WEEDS WITH TRACTOR DRAWN MECHANICAL CULTIVATORS

Performance Objective	Learning Activities	Evaluation	Resources
Given a field of flowers planted in rows needing to be weeded, a tractor with a 3 point hitch and an adjustable sweep type cultivator, remove the weeds by cultivation. For satisfactory performance, no more than 5 percent of the floral plants will be damaged in the cultivation process, at least 90 percent of all visible weeds will be killed, and weeding must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 791 'Weed Identification' (slidefilm/slideset) 791a (supp) Practice Set Weed Identification' (slidefilm/slideset) 800 'Identification of Weed Seedlings, Pt. 1' (slidefilm/slideset) 801 'Identification of Weed Seedlings, Pt.2' (slidefilm/slideset) 803 'Identification of Weed Seedlings, Pt.3' (slidefilm/slideset) 811 'The Wicked World of Weeds' (slidefilm/slideset) OHIO 'Weed Control - Cultural and Chemical' (slidefilm/slideset)
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - reasons to remove weeds (competition), common weeds, attaching cultivator to tractor	4) Participation	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

Floriculture Unit: CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Competency Task: REMOVE WEEDS WITH TRACTOR DRAWN MECHANICAL CULTIVATORS

Performance Objective	Learning Activities	Evaluation	Resources
			Floriculture Worker Performance Guide

240

241

1. Identify the field area to be cultivated.

2. Connect cultivator to tractor and perform a pre-service check on the unit prior to use.

3. Set cultivator sweep distances and make necessary adjustments on the cultivator.

4. Drive tractor down rows removing as many as possible of the weeds without damaging the floral crop.

5. Clean and store cultivator and tractor when the task is finished.

Irrigation Practices

- Hand Water Plants, *page 135*
- Apply Water in Ditches or Furrows, *page 137*
- Pump Water for Irrigation, *page 139*
- Set Time Clocks for Automatic Irrigation System, *page 141*
- Regulate Trickle or Ooze Irrigation System, *page 143*

Irrigation Practices

Floriculture Unit: IRRIGATION PRACTICES

Competency Task: HAND WATER PLANTS

Performance Objective	Learning Activities	Evaluation	Resources
Given designated plants requiring hand watering, a reliable source of water, a garden hose with an appropriate water breaker, hand irrigate the plants. For satisfactory performance, all plants are to receive the required amount of water, none are to be damaged either through receiving too much water or by washing out the medium if applied too fast, and watering must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	CALIFORNIA 1-240-234 'Greenhouse Maintenance' (filmstrip)
	3) Read subject-matter units	3) Notes	
	4) Group discussion - underwatering/overwatering symptoms	4) Participation	'How to Water Greenhouse Plants'
	5) Demonstration - floriculture worker/instructor	5) Attendance	KENTUCKY GG-51 'Watering Plants' (module)
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	FD-5 'Watering Potted Plants' (module) Floriculture Worker Performance Guide

Floriculture Unit: IRRIGATION PRACTICES

Competency Task: APPLY WATER IN DITCHES OR FURROWS

Performance Objective	Learning Activities	Evaluation	Resources
Given shovels, hoes, syphon tubes or other conveyors, a flower crop grown under field conditions to be irrigated, a source of water and the necessary distributing ditches and furrows, apply irrigation water to the crop. For satisfactory performance, water must be evenly distributed in furrows over the area to be irrigated, there should be adequate and uniform wetting with little or no erosion and loss of either water or soil from the field, and watering must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-23 'Watering Plants' (module) Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Demonstration - floriculture worker/instructor	3) Attendance	
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	

Performance Guide

APPLY WATER IN DITCHES OR FURROWS

1. Check all ditches and turnouts for adequacy in handling water.
2. Determine irrigation schedule and availability of water.
3. Set water in tiers of open furrows or through syphons, whichever is preferred.
   Caution: To start and maintain the flow chart of water through syphons the water in the distributing ditch must be maintained at a higher level (usually at least 3-4 inches higher) than that of the irrigation furrow. If it is not maintained at a sufficiently high level the water will cease to flow through the syphon.
4. Tend water continually to prevent clogging of furrows or syphons.
5. Turn pump or other source of water off when task is completed.
6. Clean all equipment and return to storage following use.

Floriculture Unit: IRRIGATION PRACTICES

Competency Task: PUMP WATER FOR IRRIGATION

Performance Objective	Learning Activities	Evaluation	Resources
Given a well, lake or other adequate source of irrigation water and either a diesel or electric irrigation supply pump, pump water for irrigation. For satisfactory performance, pump must be started and operated to the satisfaction of the instructor, and in accordance with the instructions contained in the operator's manual.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Review manufacturer's instructions and safety recommendations	2) Notes	
	3) Demonstration - floriculture worker/instructor	3) Attendance	
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	

1. Make the necessary service check to insure the smooth and safe operation of the pump.

2. Start motor and operate the pump. It may be necessary to prime the pump if the pump is not self-priming.

3. Return all unused service material and equipment to storage.

Floriculture Unit: IRRIGATION PRACTICES

Competency Task: SET TIME CLOCKS FOR AUTOMATIC IRRIGATION SYSTEM

Performance Objective	Learning Activities	Evaluation	Resources
Given an automatic irrigation system that is operating well on a specified cycle, reset the time clocks so that the valve will open and close properly for implementing a prescribed new schedule. For satisfactory performance, when the control clocks have been reset and adjusted, the actual cycling must not deviate from the prescribed cycling schedule by more than four minutes, and must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List CALIFORNIA 'How to Water Greenhouse Plants' KENTUCKY GG-51 'Watering Plants' (module) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Review manufacturer's instructions	4) Notes	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

SET TIME CLOCKS FOR AUTOMATIC IRRIGATION SYSTEM

1. Obtain irrigation schedule.
2. Observe system to determine cycling.
3. Set time clocks to conform to desired schedule.
4. Test system on new schedule to make certain it is reliable, making such adjustments as may be required.

Floriculture Unit: IRRIGATION PRACTICES

Competency Task: REGULATE TRICKLE OR OOZE IRRIGATION SYSTEM

Performance Objective	Learning Activities	Evaluation	Resources
Given a trickle/ooze irrigation system requiring regulation, a pressure guage and a pressure regulator, regulate the system to a specified pressure. For satisfactory performance, the adjusted pressure must be correct ±½ pounds per square inch, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	CALIFORNIA 'How to Water Greenhouse Plants'
	3) Read subject-matter units	3) Notes	
	4) Group discussion - trickle/ooze irrigation systems	4) Participation	KENTUCKY GG-51 'Watering Plants' (module)
	5) Demonstration - floriculture worker/instructor	5) Attendance	GG-47 'Servicing Irrigation Systems' (module)
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	Manufacturer's Instructions Floriculture Worker Performance Guide

1. Read guage and determine if reading is too high or too low when stabilized.
2. Adjust the regulator handle to obtain the desired reading. Caution: The system should be adjusted while it is in operation to insure accurate pressure readings.
3. Check system for leaks and repair the same if they are found.
4. Read guage and make final adjustments based on irrigation requirements.

Plant Pest and Disease Control

- Report Disease and Insect Damage, *page 145*
- Remove Dead and Diseased Plant Parts, *page 147*
- Remove Diseased Plants, *page 149*
- Mix Chemicals, *page 151*
- Apply Chemicals, *page 154*
- Identify and Report Spray Damage, *page 157*
- Set Out Poison Bait, *page 159*

Plant Pest and Disease Control

Floriculture Unit: PLANT PEST AND DISEASE CONTROL

Competency Task: REPORT DISEASE AND INSECT DAMAGE

Performance Objective	Learning Activities	Evaluation	Resources
Given a hand lens or other magnifying glass and floral plants growing in a greenhouse, shadehouse or in an open field, examine the plants and report the damage resulting from disease and/or insects. For satisfactory performance, 90 percent of any observable and distinguishable damage must be correctly reported and agree with instructor findings.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List CALIFORNIA 'Insect Identification Learning Kit' (slideset) GEORGIA 'Recognizing Pests and Pesticides' OHIO 'Some Common Types of Insects' (manual) AGDEX 200/630 'Diseases of Greenhouse Flower Crops' (filmstrip) AGDEX 200/600 'Common Insects of Greenhouse Crops' (filmstrip) Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - common greenhouse disease and insect problems	4) Participation	
	5) Group/Independent Project - disease/insect identification	5) Notes/Instructor Quiz	
	6) Group/Independent Project - disease/insect collection	6) Collection	
	7) Demonstration - floriculture worker/instructor	7) Attendance	
	8) Complete Performance Objective	8) Performance Guide/Instructor Approval	

Performance Guide

REPORT DISEASE AND INSECT DAMAGE

1. Identify the area in which the floral plants are to be observed.

2. Observe the plants, distinguishing between damage caused by insects and that which appears to be the result of disease.

3. Report findings.

Floriculture Unit: PLANT PEST AND DISEASE CONTROL

Competency Task: REMOVE DEAD AND DISEASED PLANT PARTS

Performance Objective	Learning Activities	Evaluation	Resources
Given a pair of floral shears, a knife and specimens of potted plants and/or other floriculture specimens grown for market, remove all dead or diseased plant parts which might detract from the appearance of the plants or interfere with their market value. For satisfactory performance, all of the dead or diseased plant parts must be removed and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-66 'Removing Dead and Diseased Blooms and Plant Parts' (module) NEW YORK 01.0599-08 'Preparing Flowers for Sale' (module) WEST VIRGINIA 09 'Disease and Pest Control' (module) Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Demonstration - floriculture worker/instructor	3) Attendance	
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	

1. Identify plants from which diseased parts are to be removed.
2. Remove diseased plant parts without damaging plants.
3. Dispose of plant parts that have been removed.

Floriculture Unit: PLANT PEST AND DISEASE CONTROL

Competency Task: REMOVE DISEASED PLANTS

Performance Objective	Learning Activities	Evaluation	Resources
Given plants grown in beds, pots or frames in the greenhouse or shadehouse, observe these plants regularly, removing those that are diseased. For satisfactory performance, at least 98 percent of the diseased plants must be identified and removed and removal must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Read subject-matter units	2) Notes	KENTUCKY NP-59 'Removing Diseased Plants' (module)
	3) Group discussion - importance of removing diseased plants, disposal of diseased plants	3) Participation	WEST VIRGINIA 09 'Disease and Pest Control' (module)
	4) Demonstration - floriculture worker/instructor	4) Attendance	Floriculture Worker
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	Performance Guide

Performance Guide REMOVE DISEASED PLANTS

1. Review symptoms of most common diseases of floral plants.
2. Remove all plants that are diseased or carry disease symptoms.
3. Properly dispose of all diseased plants.
   Caution: If there is a serious disease problem, burning is the preferred method of disposal.

Floriculture Unit: PLANT PEST AND DISEASE CONTROL

Competency Task: MIX CHEMICALS

Performance Objective	Learning Activities	Evaluation	Resources
Given a specified number of plants or land area to be treated and the water, chemicals, tanks, and safety equipment necessary for mixing, mix the required amount of spray solution for use on the specified plants or land area to be treated. For satisfactory performance, the chemicals must be mixed according to the manufacturer's instructions and follow all safety recommendations in addition to meeting instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 1108-1 'Understanding and Safe Use of Pesticides' (slidefilm/slideset) 1108-1.2 'Selecting and, Handling Pesticides' (slidefilm/slideset) 4045a 'Handling and Using Pesticides Safely' (slidefilm/slideset) 'Applicator's Study Guide' GEORGIA 'Handling Pesticides Safely' KENTUCKY NP-52 'Mixing Chemicals' (module) WISCONSIN 150 'Understanding Pesticide Labels' (bulletin)
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - various forms of chemicals and compatibility of chemicals	4) Participation	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Applicator's License	6) Pass Test/Receive License	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

Floriculture Unit: PLANT PEST AND DISEASE CONTROL

Competency Task: MIX CHEMICALS - 2

Performance Objective	Learning Activities	Evaluation	Resources
			EPA Standards and Regulations
			Manufacturer's Instructions
			Floriculture Worker
			Performance Guide

1. Review mixing procedures as provided by the manufacturer to determine exact procedures to be followed in mixing and also the amount of spray solution required.
2. Review safety precautions and measures to be followed in mixing.
3. Mix the required amount of spray solution.
4. Clean all containers and other items used for mixing as recommended by manufacturer, and return them along with any unused materials to their proper place when the task is finished.
5. Dispose of used cartons or other contaminants in accordance with current Environmental Protection Agency regulations.

Catuion: Do not burn pesticide containers.

Floriculture Unit: PLANT PEST AND DISEASE CONTROL

Competency Task: APPLY CHEMICALS

Performance Objective	Learning Activities	Evaluation	Resources
Given a designated land area or greenhouse plants on which a chemical solution is to be applied, the solution, a hand sprayer and the recommended clothing or other safety equipment, apply the chemical. For satisfactory performance, all necessary safety precautions should be followed, the solution must be applied uniformly at the recommended rate, covering the plants uniformly and thoroughly, and application must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List ILLINOIS 1108-1.2 'Selecting and Handling Pesticides' (slidefilm/slideset) 1108-1.3 'Calibrating and Applying Pesticides Safely' (slidefilm/slideset) 4045a 'Handling and Using Pesticides Safely' (slidefilm/slideset) 'Applicator's Study Guide' CALIFORNIA 'How to Safely Use Sprays and Dusts on Plants' GEORGIA 'Handling Pesticides Safely' 'Type and Size of Sprays to Use'
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - EPA standards/regulations, safety equipment and clothing, types of sprayers	4) Participation	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Applicator's License	6) Pass Test/Receive License	
	7) Complete Performance Objective	7) Performance Guide/Instructor Approval	

Floriculture Unit: PLANT PEST AND DISEASE CONTROL

Competency Task: APPLY CHEMICALS - 2

Performance Objective	Learning Activities	Evaluation	Resources
			GEORGIA - con't. 'Applying Pesticides' KENTUCKY GG-72 'Applying Chemicals to Diseased Plants' (module) EPA Standards and Regulations Manufacturer's Instructions Floriculture Worker Performance Guide

Performance Guide

APPLY CHEMICALS

1. Review safety procedures.
2. Check the sprayer to make sure it is in good working order.
3. Using water rather than spray solution, calibrate the sprayer to apply the precise amount of spray desired.
4. Put on the appropriate clothing for meeting safety requirements.
5. Put spray solution in sprayer.
6. Bring spray tank to recommended pressure.
7. Apply spray to plants, until spray begins to drip off leaf surface. Spray underside of leaves also.
8. Thoroughly wash and clean sprayer and all equipment as recommended by manufacturer used when task is completed.
9. Return all tools and equipment to storage.

Floriculture Unit: PLANT PEST AND DISEASE CONTROL

Competency Task: IDENTIFY AND REPORT SPRAY DAMAGE

Performance Objective	Learning Activities	Evaluation	Resources
Given a pencil and pad, a bed of flowers growing in a greenhouse, a portion which has been damaged by spray, describe the damage and report it in writing to the instructor. For satisfactory performance, no spray damaged areas will be missed, and reports will agree with instructor findings.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Group discussion - spray damage identification	2) Participation	Co-Operative Extension Service Office Floriculture Worker
	3) Spray damage identification	3) Notes/Instructor Quiz	Performance Guide
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

1. Review characteristics of spray damage in contrast to damage resulting from drought, pollution, gas, and application of excessive amounts of fertilizer.
2. Identify the bed to be examined for spray damage.
3. Identify spray damaged area, describe and report it in writing.

Floriculture Unit: PLANT PEST AND DISEASE CONTROL

Competency Task: SET OUT POISON BAIT

Performance Objective	Learning Activities	Evaluation	Resources
Given poison bait and an area where rodents are to be eradicated, set out the poisoned bait. For satisfactory performance, bait must be placed not only where it will be conveniently accessible to rodents but also where it will not be eaten by cats, dogs, chickens, or domestic animals, and placement must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-53 'Controlling Animal Pests' (module) Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Demonstration - floriculture worker/instructor	3) Attendance	
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	

Performance Guide

SET OUT POISON BAIT

1. Identify area to be baited.
2. Place the bait in such a way that it will be accessible to rodents without danger to domestic animals.
3. Dispose of dead rodents when found.

Harvesting Crops

- Cut Flowers, *page 161*
- Count and Bunch Flowers, *page 163*
- Count and Bunch Fern, *page 165*
- Prepare and Place Cut Flowers in Water or Preservative, *page 167*
- Load Potted Plants for Transporting, *page 169*
- Remove Saleable Plants from Beds or Benches, *page 171*
- Remove Bedwire or Fibered Plastic from Harvested Areas, *page 173*
- Dig Bulbs or Corms, *page 175*
- Clean and Size Harvested Bulbs or Corms, *page 177*
- Dry Harvested Bulbs or Corms, *page 179*
- Treat Bulbs or Corms to Control Disease, *page 181*

Harvesting Crops

Floriculture Unit: HARVESTING CROPS

Competency Task: CUT FLOWERS

Performance Objective	Learning Activities	Evaluation	Resources
Given the appropriate containers and conveyance for hauling, a cut flower crop to be harvested and a cutting knife for harvesting, cut (harvest) the flowers. For satisfactory performance, flowers must be at late bud or early bloom stage of development, free from disease and physical damage, meeting market requirements, and instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List Local Market Requirements Floriculture Worker Performance Guide
	2) Group/Independent Research - local industry practices	2) Notes/Report findings	
	3) Group/Independent Research - market requirements for cut flower crops	3) Notes/Report findings	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

286

287

Performance Guide CUT FLOWERS

1. Determine any special buyer requirements and grade specifications.

2. Identify the particular beds or field areas from which flowers are to be harvested.

3. Harvest (cut) the flowers in late bud or early bloom stage of development, meeting the market requirements.

4. Place flowers from the baskets or other containers in the truck or other vehicle provided.

Floriculture Unit: HARVESTING CROPS

Competency Task: COUNT AND BUNCH FLOWERS

Performance Objective	Learning Activities	Evaluation	Resources
Given the flowers, standards to be followed in counting and bunching, and the necessary materials, count and bunch the flowers. For satisfactory performance, the count must be 100 percent accurate, stems must be pointing in the same direction and of uniform length when placed in the bunch, bunches will be firmly bound together by double or triple wrapping with a rubber band, and meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-68 'Packaging and Loading Orders' (module) NEW YORK 01.0599-08 'Preparing Flowers for Sale' (module) WEST VIRGINIA 10 'Sale Preparation' (module) Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group/Independent Research - local industry practices	3) Notes/report findings	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

1. Become familiar with prescribed standards for counting and bunching before beginning the task.

2. Identify the flowers to be counted and bunched.

3. Count and bunch flowers according to the standards set for the specific flower type.

Floriculture Unit: HARVESTING CROPS

Competency Task: COUNT AND BUNCH FERN

Performance Objective	Learning Activities	Evaluation	Resources
Given fern to be harvested, quality specifications, a knife, and rubber bands, cut the fern, count it and bind it into bunches. For satisfactory performance, only high quality leaves are to be cut, 20 leaves will comprise each bunch and elastic bands will be used to bind the leaves comprising a bunch together. Bunching will meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	OHIO
	3) Read subject-matter units	3) Notes	'Design Greens' (slides and script)
	4) Demonstration - floriculture worker/instructor	4) Attendance	WEST VIRGINIA 10 'Sale Preparation' (module)
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	Floriculture Worker Performance Guide

COUNT AND BUNCH FERN

1. Identify rows which are to be harvested.
2. Using blade of cutting knife and thumb, harvest only select fern of high quality, counting out the required number of fern leaves to be included in each bunch. Caution: While an occasional bunch may be made up of one more or less than the required number this will be discouraged by growers.
3. Bind each bunch with a rubber band when the correct number of leaves have been cut.
4. Stack bunches of fern at ends of row for loading on trucks.

Floriculture Unit: HARVESTING CROPS

Competency Task: PREPARE AND PLACE CUT FLOWERS IN WATER OR PRESERVATIVE

Performance Objective	Learning Activities	Evaluation	Resources
Given the required solution, vats or other suitable containers, a pair of shears, flowers to be prepared in water or other preservative solution, prepare the flowers and place them in the solution. For satisfactory performance, stems of the flowers will be freshly cut to a uniform length, the solution will cover not less than 1/3 or more than 1/2 the length of the flower stems, and preparation/placement must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY FD-4 'Conditioning Cut Flowers' (module) MICHIGAN E-558 'Proper Care of Cut Flowers' (bulletin) OHIO 'Cut Flowers' (slides and script) CALIFORNIA 1-240-233 'Care and Handling of Cut Flowers & Foliage' (filmstrip) Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group discussion - cleaning containers to prevent fungal infestations	4) Participation	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

1. Remove all unsuitable floral specimens and discard. Caution; Diseased and malformed flowers are not to be placed in the preservative. Also, some varieties should be counted and bunched prior to treatment.

2. Clean containers to prevent disease infestations.

3. Trim the stems so that all are freshly cut and approximately of the same length.

4. Remove the bottom 1/3 of foliage.

5. Pound woody stems to aid in water update.

6. When properly trimmed and otherwise prepared, place flowers in the preservative. Caution: Use dividers or racks to prevent flowers from falling down and becoming submerged in the perservative.

7. Leave flowers at room temp. for 2-4 hours before placing in cooler.

8. Clean up the work area and dispose of the culled or discarded flowers when the task is completed.

Floriculture Unit: HARVESTING CROPS

Competency Task: LOAD POTTED PLANTS FOR TRANSPORTING

Performance Objective	Learning Activities	Evaluation	Resources
Given potted plants for delivery and a truck or other suitable conveyance, load the plants for delivery. For satisfactory performance, plants must be closely packed and arranged according to size so none will be damaged during transporting, and loading must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	KENTUCKY
	3) Read subject-matter units	3) Notes	NP-68 'Packaging and Loading Orders' (module)
	4) Demonstration - floriculture worker/instructor	4) Attendance	OHIO 'Flowering Potted Plants' (slides and script)
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	Floriculture Worker Performance Guide

299

293

1. Identify all plants to be hauled.

2. Appraise the nature of the shipment - its size, shape and content - to determine the best plan for loading.

3. Load all plants that are packaged and crated at the front of the truck, as compactly as possible.
   Caution: Make sure that no heavy wooden crates are placed on cardboard boxes or on smaller and more fragile wooden crates. Also, depending on the nature of the load, roads and distances to be traveled, rope should be used to secure the bulk of the shipment and to prevent it from shifting.

4. Place any large or single potted plants with foliage too large or extensive to crate in closely spaced boxes, open cartons or crates and secure them as necessary when the loaded plants do not occupy the total 'floor' space on the truck.

5. Close gates on loaded truck, making sure they are secure.

Floriculture Unit: HARVESTING CROPS

Competency Task: REMOVE SALEABLE PLANTS FROM BEDS OR BENCHES

Performance Objective	Learning Activities	Evaluation	Resources
Given a collection of potted plants growing in greenhouse beds or benches containing both saleable and unsaleable plants, select those plants that are saleable and remove them from the beds or benches. For satisfactory performance, all of the plants removed must be saleable and no more than 10 percent of the saleable plants on a given bench should be overlooked. Plants designated as saleable must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List NEW YORK
	2) Read subject-matter units	2) Notes	01.0599-08 'Preparing Flowers for Sale' (module)
	3) Demonstration - floriculture worker/instructor	3) Attendance	WEST VIRGINIA
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	10 'Sale Preparation' (module) Floriculture Worker Performance Guide

302

301

Performance Guide

REMOVE SALEABLE PLANTS FROM BEDS OR BENCHES

1. Review order and decide the standard for marketable plants of a particular species.
2. Collect the saleable plants and remove them from the others, overlooking no more than 10% of the saleable plants.

Floriculture Unit: HARVESTING CROPS

Competency Task: REMOVE BEDWIRE OR FIBERED PLASTIC FROM HARVESTED AREAS

Performance Objective	Learning Activities	Evaluation	Resources
Given bedwire or fibered plastic in a greenhouse flower bed from which a crop has been harvested, remove the bedwire/fibered plastic prior to the planting of a new crop. For satisfactory performance, all wire or string holding bedwire/fibered plastic must be rolled up into a compact roll, removed from the area without damage, and removal must meet instructor approval.	1) Read appropriate selections from Master Resource List 2) Demonstration - floriculture worker/instructor 3) Complete Performance Objective	1) Notes 2) Attendance 3) Performance Guide/ Instructor Approval	Selections from Master Resource List Floriculture Worker Performance Guide

Performance Guide

REMOVE BEDWIRE OR FIBERED PLASTIC FROM HARVESTED AREAS

1. Identify the bed from which bedwire/fibered plastic is to be removed.
2. Remove all weeds, grass and debris from bed.
3. Remove string or wire securing bedwire/fibered plastic to stakes.
4. Roll up bedwire/fibered plastic into a tightly compacted roll.
5. Store bedwire/fibered plastic for future use.

Floriculture Unit: HARVESTING CROPS

Competency Task: DIG BULBS OR CORMS

Performance Objective	Learning Activities	Evaluation	Resources
Given a field of bulbs or corms to be harvested, a mowing machine, tractor and bulb digger, top and dig bulbs or corms. For satisfactory performance, all tops or above ground growth must be mowed, no more than 2 percent of the bulbs or corms should be left in the field, and digging must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) Group/Independent Research - local industry practices	2) Notes/Report findings	Local Industry
	3) Demonstration - floriculture worker/instructor	3) Attendance	Floriculture Worker
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	Performance Guide

Performance Guide

DIG BULBS OR CORMS

1. Identify field to be harvested.
2. Service tractor and equipment.
3. Mow tops of bulbs or corms to be harvested. Caution: Tops must be cut at ground level as nearly as possible and allowed to permit tops to decompose.
4. Use bulb digger to dig up bulbs or corms, observing all safety precautions.
5. Remove bulbs or corms and all equipment from field.
6. Clean and store equipment when job is completed.

Floriculture Unit: HARVESTING CROPS

Competency Task: CLEAN AND SIZE HARVESTED BULBS OR CORMS

Performance Objective	Learning Activities	Evaluation	Resources
Given 2 crates or bushels of bulbs or corms to be cleaned and sized, specified standards, a supply of water, a water hose and a sizing table, clean and size the bulbs or corms. For satisfactory performance, excessive amounts of dirt, trash and debris must be removed, 95 percent or more of the bulbs or corms must be correctly sized by means of grading models, and separated into at least 3 categories based either on quality or size as determined by the instructor.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-63 'Grading Plants' (module) Local Industry Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group/independent Research - local industry practices	3) Notes/Report findings	
	4) Group/Independent Research - grading standards	4) Notes/Report findings	
	5) Group discussion - grading standards for bulbs or corms	5) Participation	
	6) Demonstration - floriculture worker/instructor	6) Attendance	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

1. Identify the bulbs or corms to be cleaned and graded.

2. Become familiar with the market requirements or other predetermined standards that are to be followed in the cleaning and grading.
   Caution: If no recognized market or grading standards have been developed, it will be advisable for teachers to set up standards that will be used in the training program.

3. Clean and size the bulbs.
   Caution: Normally bulbs or corms are not washed, buth where soils are wet and/or heavy when bulbs or corms are harvested, washing with water is permissible when sizing the bulb.

4. Clean all equipment following use and return to storage.

Floriculture Unit: HARVESTING CROPS

Competency Task: DRY HARVESTED BULBS OR CORMS

Performance Objective	Learning Activities	Evaluation	Resources
Given two bushels of harvested bulbs or corms in baskets or sacks, drying racks and other necessary items, place the bulbs or corms appropriately on racks and dry them. For satisfactory performance, bulbs or corms must be air dried sufficiently after harvesting to prevent them from acquiring mildew and rotting in storage. When adequately dried, there should be no exterior moisture in evidence, interior moisture should be sufficiently reduced to prevent rotting, and bulbs/corms must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List Local Industry Floriculture Worker Performance Guide
	2) Group/Independent Research - local industry practices	2) Notes/Report findings	
	3) Demonstration - floriculture worker/instructor	3) Attendance	
	4) Complete Performance Objective	4) Performance Guide/ Instructor Approval	

DRY HARVESTED BULBS OR CORMS

1. Determine which particular bulbs or corms are to be dried and arrange drying area and the racks provided.
2. Remove excess soil from harvested bulbs or corms.
   Caution: When soil is heavy and especially when bulbs or corms are harvested when the land is wet, it may be necessary to wash bulbs or corms with water before drying.
3. Place bulbs or corms in racks for drying.
   Caution: Bulbs or corms must be spaced properly in racks and must not be piled on top of each other.
4. Air dry for a sufficient period of time.
5. Place bulbs or corms in storage following drying period.

Floriculture Unit: HARVESTING CROPS

Competency Task: TREAT BULBS OR CORMS TO CONTROL DISEASE

Performance Objective	Learning Activities	Evaluation	Resources
Given the necessary applicators and/or containers, bulbs or corms to be treated, and a specially prepared fungicidal dip or powder, treat the bulbs or corms. For satisfactory performance, if a specially prepared dip is to be used, the bulbs or corms should be completely submerged in the solution and allowed to remain 10 seconds before being removed. If powder is to be used, a few bulbs or corms should be treated at a time to insure complete coverage. In either case, spoilage losses should not exceed 2 percent, and treatments must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List
	2) View filmstrips/slides	2) Notes	ILLINOIS
	3) Read subject-matter units	3) Notes	1108-1.1 'Understanding and Safe Use of Pesticides' (slidefilm/slideset)
	4) Group discussion - diseases common to bulbs/corms, their treatments	4) Participation	CALIFORNIA 'How to Safely Use Sprays and Dusts on Plants'
	5) Group/Independent Research - local industry practices	5) Notes/Report findings	
	6) Demonstration - floriculture worker/instructor	6) Attendance	GEORGIA 'Applying Pesticides'
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	KENTUCKY GG-69 'Controlling Insects on Plants' (module)
			NEW YORK 01.0599-01 'Controlling Insects, Diseases and Fertilization' (module)

Floriculture Unit: HARVESTING CROPS

Competency Task: TREAT BULBS OR CORMS TO CONTROL DISEASE - 2

Performance Objective	Learning Activities	Evaluation	Resources
			WEST VIRGINIA 9 'Disease and Pest Control' (module) Manufacturer's Instructions Local Industry Floriculture Worker Performance Guide

1. Identify bulbs or corms to be treated.
2. Determine which method of treatment is to be used.
3. Treat the bulbs in accordance with recommended practices and safety regulations for the method of treatment which is to be used. Caution: If the dust method is used it is especially important that only a few bulbs or corms are treated at one time. Dust can either be applied by hand or by means of dusting gun, but the entire surface of the bulbs or corms should be treated. If the dip method is used, bulbs or corms must first be submerged in the dip and then drained and allowed to dry before being placed in storage.
4. Clean up utensils and restore all items to their appropriate place following treatment.

Packaging, Storage and Shipment

- Inventory Plants, *page 184*
- Grade Potted Flower or Foliage Plants, *page 187*
- Grade Cut Flowers, *page 189*
- Place Plant Materials in Storage, *page 191*
- Prepare Invoices and Shipping Labels, *page 193*
- Package Orders for Shipment, *page 195*
- Assemble Shipping Cartons, *page 200*

Packaging, Storage and Shipment

Floriculture Unit: PACKAGING, STORAGE AND SHIPMENT

Competency Task: INVENTORY PLANTS

Performance Objective	Learning Activities	Evaluation	Resources
Given the necessary inventory sheets and assorted plants to be inventoried, inventory the plants according to their varieties, size, and container size. For satisfactory performance, all plants must be listed and classified as to variety, and the inventory must be verified by the instructor.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY GG-73 'Purchasing & Transporting Plants, Equipment, and Supplies' (module) Sample Inventory Sheet Local Industry Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group discussion - importance of current inventory, frequency of taking inventory	3) Participation	
	4) Group/Independent Research - local industry practices	4) Notes/Report findings	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

1. Prepare inventory sheet in advance and place it on a clip board so that it will be ready for use.
2. Count and record actual number of plants in each category according to variety, quantity, container size, etc., proceeding systematically.
3. Total each category to obtain your final count.
4. Turn inventory over to your instructor when the inventory has been completed and checked.

INVENTORY SHEET FOR A FLORICULTURE OPERATION

VARIETY	QUANTITY	CONTAINER SIZE	SIZE AND NUMBER OF PLANTS PER POT(if app.)	PLANT CONDITION

Floriculture Unit: PACKAGING, STORAGE AND SHIPMENT

Competency Task: GRADE POTTED FLOWER OR FOLIAGE PLANTS

Performance Objective	Learning Activities	Evaluation	Resources
Given 5 dozen potted foliage or floral plants to be graded, grade the plants. For satisfactory performance, at least 90 percent of the plants graded must conform to model plants and the grading standards adapted by Pi Alpha Xi, the National Honorary Fraternity in Floriculture and Ornamental Horticulture, and graded plants must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-63 'Grading Plants' (module) WEST VIRGINIA 10 'Sale Preparation' (module) Pi Alpha Xi Grading Standards Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group/Independent Project - study model plants and Pi Alpha Xi grading standards	3) Notes	
	4) Group/Independent Project - practice grading plants	4) Instructor Approval	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Approval	

1. Study the models provided and Pi Alpha Xi grades and standards for judging.
2. Establish an image of the perfect model or ideal plant.
3. Compare plants to be graded to the models and standards given.
4. Grade the plants in accordance with image of the ideal or model.

Floriculture Unit: PACKAGING, STORAGE AND SHIPMENT

Competency Task: GRADE CUT FLOWERS

Performance Objective	Learning Activities	Evaluation	Resources
Given 100 carnations or other cut flowers grown for market, grade the flowers. For satisfactory performance, at least 95 percent of the 100 flowers must be placed in their correct grade as identified by model flowers and standards set by the Society of American Florists. Graded flowers must meet instructor approval.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-63 'Grading Plants' (module) NEW YORK 01.0599-08 'Preparing Flowers for Sale' (module) OHIO 'Cut Flowers' (slides and script) WEST VIRGINIA 10 'Sale Preparation' (module) Society of American Florists Grading Standards Floriculture Worker Performance Guide
	2) View filmstrips/slides	2) Notes	
	3) Read subject-matter units	3) Notes	
	4) Group/Independent Project - study model flowers and standards of Society of American Florists	4) Notes	
	5) Group/Independent Project - practice grading flowers	5) Instructor Approval	
	6) Demonstration - floriculture worker/instructor	6) Attendance	
	7) Complete Performance Objective	7) Performance Guide/ Instructor Approval	

GRADE CUT FLOWERS

1. Identify flowers to be graded.
2. Study models provided and classifications for cut flowers.
3. Develop an image of the 'perfect' flower.
4. Grade the cut flowers based on the image of the 'perfect' flower and in accordance with the models given and standards of the Society of American Florists.

Floriculture Unit: PACKAGING, STORAGE AND SHIPMENT

Competency Task: PLACE PLANT MATERIALS IN STORAGE

Performance Objective

Given storage facilities and plants to be placed in storage, prepare the plants and store them. For satisfactory performance, preparatory to storage, plant stems must be cut and placed in a container holding water or preservative solution so that standards of quality can be maintained. No plants should be damaged in the process, and instructor approval must be obtained.

Learning Activities	Evaluation
1) Read appropriate selections from Master Resource List	1) Notes
2) View filmstrips/slides	2) Notes
3) Read subject-matter units	3) Notes
4) Group discussion - types of storage/ their affect on plant life, senesence; refrigerator, hypobaric storage	4) Participation
5) Group/Independent Research - local industry practices	5) Notes/Report findings
6) Demonstration - floriculture worker/instructor	6) Attendance
7) Complete Performance Objective	7) Performance Guide/ Instructor Approval

Resources

Selections from Master Resource List

KENTUCKY

FD-4 'Conditioning Cut Flowers' (module)

MICHIGAN

'Proper Care of Cut Flowers' (bulletin)

NEW YORK

01.0599-08 'Preparing Flowers for Sale' (module)

WEST VIRGINIA

10 'Sales Preparation' (module)

Floriculture Worker

Performance Guide

Performance Guide

PLACE PLANT MATERIALS IN STORAGE

1. Identify the kinds of plants that are to be stored.
2. Prepare plants for storage according to their particular needs.
3. Place plants in storage.

Floriculture Unit: PACKAGING, STORAGE AND SHIPMENT

Competency Task: PREPARE INVOICES AND SHIPPING LABELS

Performance Objective	Learning Activities	Evaluation	Resources
Given three blank invoices and labels for shipping, and all necessary data, complete the invoices and labels. For satisfactory performance, the invoices and labels will be completed without error and extensions and totals must be verified by the instructor.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-68 'Packaging and Loading Orders' (module) Sample Invoice Sample Shipping Label Floriculture Worker Performance Guide
	2) Read subject-matter units	2) Notes	
	3) Group discussion - information needed on invoices and shipping labels	3) Participation	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

1. On the invoice indicate the receiver and buyer.
2. Check to determine presence of packer's signature.
3. Note the method of shipment.
4. Indicate quantity shipped, plant description, extend unit price, and total.
5. Add sales tax, if applicable.
6. Verify shipment against quantity ordered.
7. Total prices.
8. Complete shipping/ labels indicating receiver, sender, purchase order number and invoice number.

Floriculture Unit: PACKAGING, STORAGE AND SHIPMENT

Competency Task: PACKAGE ORDERS FOR SHIPMENT

Performance Objective	Learning Activities	Evaluation	Resources
Given the necessary boxes, wrapping materials, potted plants and/or cut flowers to fill an order, package the materials for shipment. For satisfactory performance, all items included on the instructor checklist must be rated 'acceptable'.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List KENTUCKY NP-68 'Packaging and Loading Orders' (module) Local Industry Floriculture Worker Performance Guide Instructor Checklist Sample Invoice Sample Shipping Label
	2) Read subject-matter units	2) Notes	
	3) Group/Independent Research - local industry practices	3) Notes/Report findings	
	4) Group discussion - packaging materials, methods	4) Participation	
	5) Demonstration - floriculture worker/instructor	5) Attendance	
	6) Complete Performance Objective	6) Performance Guide/ Instructor Checklist	

Performance Guide PACKAGE ORDERS FOR SHIPMENT

1. Review the packaging and shipping procedures for the particular order being filled.

2. Package the plants following requirements for safe shipment for the kind of plants being shipped.
   a. Make certain plants are in good condition when packed.
   b. Pack flowers firmly to prevent movement in shipping.
   c. Provide insulation for temperature control and to prevent the plants from becoming too dry. Waxed paper, boxes or plastic wrapper, should be available for achieving those purposes.

3. Include the necessary invoices and shipping labels.

4. Clean up the work area after completion of task.

PACKAGE ORDERS FOR SHIPMENT

ACCEPTABLE

1. Shipping instructions were reviewed before proceeding to package the order.
2. The appropriate size box was used to package the order.
3. Plants were wrapped in accordance with the requirements for the kinds and quantities of flowers being shipped.
4. Newspaper, excelsior or other filler was used judiciously in packaging the order and as required for assuring arrival of shipment without damages and in good condition.
5. Invoice and shipping labels were included with the order.

SAMPLE INVOICE

Co. Certification No. N11111

Ace Nursery and Supply
Hometown, Illinois 6----

Ship to:	Sold to:

Packed by: ____________________

Shipped via: ____________________

QUANT. ORDERED	QUANT. SHIPPED	DESCRIPTION	UNIT	STOCK NO.	UNIT PRICE	TOTAL PRICE

This space for State Department of Agriculture Inspector's Seal

This space for USDA Inspector's Seal

SAMPLE SHIPPING LABEL

SHIP TO: ______________________________ FROM: ______________________________

ADDRESS: ______________________________ ______________________________

______________________________ ______________________________

CUSTOMER ORDER NUMBER: ______________________________

INVOICE NUMBER: ______________________________

**May be posted or stapled on to shipping container

Floriculture Unit: PACKAGING, STORAGE AND SHIPMENT

Competency Task: ASSEMBLE SHIPPING CARTONS

Performance Objective	Learning Activities	Evaluation	Resources
Given unassembled shipping cartons, tape, stapling gun and other essential materials and equipment, assemble the shipping cartons. For satisfactory performance, cartons must be symmetrical and sufficiently strong to sustain and protect the floral plants to be shipped in them.	1) Read appropriate selections from Master Resource List	1) Notes	Selections from Master Resource List Manufacturer's Instructions Floriculture Worker Performance Guide
	2) Read manufacturer's instructions (usually printed on side of unassembled carton)	2) Notes	
	3) Group discussion - types of plant shipping containers - cardboard, styrofoam, etc.	3) Participation	
	4) Demonstration - floriculture worker/instructor	4) Attendance	
	5) Complete Performance Objective	5) Performance Guide/ Instructor Approval	

Performance Guide ASSEMBLE SHIPPING CARTONS

1. Arrange all necessary equipment and materials for convenient use in the work area.
2. Assemble each carton after unfolding, stapling and taping.
3. Check each carton to insure proper assembly.
4. Stack cartons in proper storage area.
5. Return all unused materials to storage when task is completed.